TRANSACTIONS

MAINE STATE POMOLOGICAL SOCIETY

1903.

GEORGE B. SAWYER, First Secretary. See page 148.

TRANSACTIONS

OF THE

Maine State Pomological Society

For the Year 1903.

EDITED BY THE SECRETARY,

D. H. KNOWLTON.

AUGUSTA
KENNEBEC JOURNAL PRINT
1904

CONTENTS.

SECRETARY'S ANNUAL REPORT.

One after another there have been three freakish years, the last of which perhaps because we are right in it, seems the worst —a frost every month in the year—a spring frost that froze everything to death it could lay its icy breath on, and an early September frost that ruined a large part of the corn that had survived the unfavorable conditions with which it was begirt. A season like this a century ago in Maine would have made a famine as great as that of which our grandmothers told us in our youthful days. Yet under these unfavorable conditions for many of our crops, the State has had a good crop of apples. The first year the fruit was in ready demand, and in not a few cases a barrel of apples paid for a barrel of flour. The second year in consequence of the immense crop in New York and other states the price was low a large part of the season, though there in many instances in consequence of careful handling and honest packing the price was satisfactory. The present season in Maine the apple crop in the State is the largest of the three, and by some is estimated as high as a million barrels. The early or fall fruit sold well, and the prices being paid later have been satisfactory to most growers.

ORCHARD CONDITIONS.

In recent years there has been a marked improvement in the care of the orchards of the State, though in many cases there is a notable absence of care.

There was about the usual planting of fruit trees in the State —a very general planting of a few trees, though not many large plantings were made. This for years has been the policy of our farmers, and while the work of extension does not go forward

as fast as enthusiasts might wish, there is some wisdom in this, since it results in many new trees coming into bearing every year. So come what may there are likely to be some apples in Maine every year for the buyers. So far as we have been able to learn the trees set have done reasonably well. The nurserymen are keen business men and they realize that the industry in Maine is in its infancy. Their agents have been in the field, and the orders placed are more liberal than for years.

MEETINGS OF THE EXECUTIVE COMMITTEE.

The first meeting was at Augusta in January when the work of the year was outlined. It was voted to ask the legislature to enact a law for the protection of trees and shrubs from injurious insects and diseases. A bill was accordingly drawn up. President Gilbert and Dr. Twitchell appeared before the legislative committee and the bill presented later became a law. The bill will be found in the transactions of the society issued for 1902.

As to work it was voted to hold a field meeting with Mr. S. H. Dawes of Harrison; a winter meeting not later than March 15th; a horticultural school and the annual meeting.

It was also voted to hold another meeting if the funds of the society would permit.

The second meeting of the committee was at Cornish. At this meeting a majority of the committee favored attending the meeting of the American Pomological Society held in Boston.

The last meeting of the executive committee was an informal affair held in Boston during the meeting of the American Pomological Society, September 11th. It was voted to hold the annual meeting in Auburn. It was also voted to ask the St. Louis Exposition Commission for $5,000 to make an exhibition of Maine fruit at the exposition in 1904.

PUBLIC MEETINGS.

The winter meeting referred to was held in Cornish, March 18th, at which it was our pleasure to have Prof. F. W. Rane of the New Hampshire Agricultural College with us. As it happened the meeting followed a heavy storm and the roads were well nigh impassable. There was, however, a creditable display

of fruit, and an appreciative audience. Since the meeting information has reached us that it proved helpful to those present, with assurances that the society will be again invited to meet in York county.

The second horticultural school was held in Town Hall, Winthrop. The instructors were Prof. W. M. Munson, Mrs. V. P. DeCoster, Miss Louise Klein Miller and Mr. Dick J. Crosby. There were two sessions for the children of the public schools, and two evening sessions for the general public. About two hundred and fifty school children were in attendance each afternoon, and good audiences were present each evening. In addition to the work outlined in the program Mr. Crosby visited the high school and in a most acceptable manner spoke of the value of an agricultural education. Miss Miller met the teachers and the ladies of the village and we have since learned with pleasure that much village improvement has followed.

The field meeting with Mr. S. H. Dawes, Grand View Farm, Harrison, was a most delightful occasion. The trip was made via Sebago lake and the Songo river. So enchanting was the beauty of the lake and the crookedness of the river so bewildering that we begged the privilege of returning over the same route. Grand View Farm is on a high ridge of land from which one beholds the water, the hills, Mt. Washington rising above its neighbors and a wide expanse of country dotted with farms and villages. The officers were very hospitably entertained in Mr. Dawes's spacious and charming home during our stay. The program for this meeting was largely observation and study of Mr. Dawes's fruit trees and plants. Everyone was impressed by the precision with which his work of fruit growing is carried on. The rows of trees and vines were all as straight as the eye could make them. There were no weeds among the vines for the cultivator and the hoe had made clean work among them. An object of special interest to the visitors was the effect produced by Mr. Dawes's method of fertilizing, which he took special delight in explaining to all. The vines and trees were burdened with fruit and there was revealed to us the source from which he has been able to show so much handsome fruit at our exhibitions. So great was our interest that we asked Mr. Dawes to read a paper at the annual meeting that a still larger number may be able to profit from his success and it forms a

part of this volume. Following a sumptuous banquet served in his fruit house, there was a short program consisting of music and speaking by the visitors. If there was any doubt of the desirability of field meetings, it was completely silenced by the grand success of this one, which was the first held by the society.

AMERICAN POMOLOGICAL SOCIETY.

Four members of the executive committee represented the society at the meeting of the American Pomological Society in Boston, which was held in the Massachusetts Horticultural Society's new home. There was a good display of excellent fruit among which Maine fruit was not as plenty as we found it in the Boston markets. Mr. Arnold, however, from his farm showed some very fine fruit, and we all congratulated him for the deserved reward he received—a Wilder medal. Maine fruit at this time was outselling all others in the market. For one, the secretary believes that such opportunities for advertising Maine fruit among consumers should never be neglected.

The great feast of the vacation, however, was in the hall where were assembled distinguished fruit growers from nearly every state and territory. It is difficult to say which part was best, but the platform meeting under the lead of Mr. Chas. W. Garfield of Michigan was the brightest and "meatiest" fruit meeting it has ever been our privilege to attend. Several Maine fruit growers were present and had others known how much there was to be gained by meeting these enthusiastic fruit men there would have been many more.

THE WORLD'S FAIR AT ST. LOUIS.

In accordance with the vote of the society at its last annual meeting the executive committee, realizing that there was an abundance of fine fruit for an exhibition at the World's Fair to be held in St. Louis in 1904, voted to ask the exposition commission to grant the Pomological Society from the State appropriation, the sum of $5,000 for the purpose of installing and maintaining an exhibition of Maine fruit. The following letter was then prepared and sent to the commission.

To His Excellency, the Governor of the State of Maine, and the World's Fair Commission for the State of Maine:

A vote was passed by the members of the State Pomological Society at the annual meeting held at Farmington in November last, referring the matter of making an exhibition of Maine fruit at the World's Fair in 1904 to the executive committee of the society. Since then a magnificent crop of fruit has developed, and at a late meeting of the committee held in Boston it was agreed that the fruit conditions were never more favorable for showing to the world the finest apples ever grown. In behalf of the Pomological Society and the fruit growers of the State, we, as authorized by vote of the executive committee of the society, hereby respectfully request that the sum of $5,000 of the appropriation made by the last legislature for the purpose of a representation of the State at the exposition to be held in St. Louis in 1904, be set apart for the making of an exhibition of Maine fruit during the aforesaid exposition and that the expenditure of the same be made by the society under such rules as you may determine.

Recent investigations have assured our officers that the quality of the fruit this year and the importance of the fruit industry warrant us in making this request. Growers are already harvesting their fruit, and we most respectfully urge that this matter may receive early attention. The collection of fruit for exhibition purposes should begin before the crop of fruit is marketed or stored, and it should be handled by those familiar with selecting and packing exhibition fruit. Heretofore the fruit growers of the State have very largely contributed the fruit shown at the several expositions where any exhibition has been made, and we believe the time has now come when such work should be done by the State.

Should you deem it desirable to have this matter more fully discussed before taking final action upon the same we shall be very glad to arrange for some one familiar with fruit conditions to meet with you and discuss the situation. We trust you will give the matter early consideration, as the time for making the best collection of fruit is when the fruit is being gathered.

All of which we most respectfully submit to your consideration.

Dated at the office of the secretary in Farmington, this 21st day of September, 1903.

(Signed) D. H. KNOWLTON, *Secretary.*
Z. A, GILBERT, *President.*

This communication was acknowledged by the secretary of the commission, who had more or less correspondence with President Gilbert. The commission was invited to attend our annual meeting and was represented there by the secretary. The action of our society at this meeting seemed to eliminate this society from any participation in the preparation for an exhibition at so late a day. So far as the secretary knows the commission made no further recognition of our communication. The commission we learn, realizing that the fruit industry of the State is of vast importance, have arranged to install an exhibition of fruit, and the secretary can only say that so far as Maine fruit is shown at St. Louis, the Pomological Society will not appear as its representative. At the same time Maine fruit growers are entitled to a good representation at St. Louis, and the secretary is informed that it is the intention of the commission to install and maintain a display of fruit that will go far in showing the world of consumers that the land of the best apples is down in Maine.

The following letter from Mr. F. W. Taylor, Chief, Department of Horticulture, under date of November 6th, was presented at the annual meeting.

Mr. D. H. Knowlton, Secretary, Maine Pomological Society, Auburn, Me.:

DEAR SIR:—I sincerely wish that it were possible for me to be present and have the pleasure of meeting yourself and your members and that I might see the fine exhibit which I am sure you are making. I especially hope that you will have up for proper decision the question of the help which your society is to give in the participation of Maine in this exposition.

Please convey to the society my compliments and best wishes and express to them from me the hope that I may have the pleasure of meeting them individually at this exposition.

Very truly yours,

F. W. TAYLOR,
Chief, Department Horticulture.

OUR PRINTED TRANSACTIONS.

It has been the custom to reserve unbound sheets of each year's transactions, and the last five of these were bound into a cloth-bound volume uniform with the volume previously bound. Several volumes have already been delivered to public libraries and others who were entitled to them. The volume is the best printed record of the growth of Maine fruit for the five years it covers.

Buyers began early in the season to ship fruit, but the crop was so large that there was much difficulty in finding sufficient help to harvest it all. Some fine fruit was ruined by the cold before it could be gathered, and the scarcity of barrels and inadequate facilities for storage were the cause of much loss as many could not protect their fruit from freezing after it was picked. Enough fruit in this way was ruined in the State to erect many storehouses, which by the way, is now one of the great needs of the fruit-growers. Realizing this situation the program for the annual meeting was largely shaped to give prominence to handling, packing and storing apples. And to all fruit growers who may read this report the papers and discussions are commended for reading and study.

The present volume is commended to those interested in Maine's great fruit industry. The topics treated are those of chief interest at the present time. The secretary has taken great pleasure in editing the papers and discussions and sending the work on its mission to the people. He only wishes that thousands might attend the meetings where the authors presented them for consideration. More and more these conventions appeal to the fruit grower, for beside these papers and discussions there is the opportunity of mingling with practical fruit growers and enthusiastic fruit lovers. In behalf of the society the secretary extends the invitation to all.

D. H. KNOWLTON,
Secretary.

FARMINGTON, ME., December 30, 1903.

OFFICERS FOR 1903.

President.

Z. A. GILBERT, North Greene.

Vice-Presidents.

D. P. TRUE, Leeds Center,
* H. L. LELAND, East Sangerville.

Secretary.

D. H. KNOWLTON, Farmington.

Treasurer.

CHARLES S. POPE, Manchester.

Executive Committee.

President and secretary, *ex-officio*, R. H. Libbey, Newport; V. P. DeCoster, Buckfield; C. A. Arnold, Arnold.

Trustees.

Androscoggin county, A. C. Day, South Turner.
Aroostook county, John W. Dudley, Mapleton.
Franklin county, E. F. Purington, Farmington.
Cumberland county, John W. True, New Gloucester.
Hancock county, E. W. Wooster, Hancock.
Kennebec county, E. A. Lapham, Pittston.
Knox county, Alonzo Butler, Union.
Lincoln county, H. J. A. Simmons, Waldoboro.
Oxford county, * Lemuel Gurney, Hebron.
Penobscot county, A. A. Eastman, Dexter.
Piscataquis county, W. E. Leland, Sangerville.
Sagadahoc county, Edward L. White, Bowdoinham.
Somerset county, F. E. Nowell, Fairfield.
Waldo county, F. A. Putnam, Jackson.
Washington county, D. W. Campbell, Cherryfield.
York county, C. A. Hooper, Eliot.

Member of Experiment Station Council.

CHARLES S. POPE, Manchester.

Auditor.

DR. GEORGE M. TWITCHELL, Augusta.

* Deceased.

MEMBERS OF THE SOCIETY.

NOTE—Any errors or changes of residence should be promptly reported to the Secretary. Members will also confer a favor by furnishing the Secretary with their full Christian names where initials only are given.

LIFE MEMBERS.

Andrews, A. Emery ..... Gardiner
Andrews, Charles E .....Auburn
Arnold, C. A.. ....Arnold
Atherton, Wm. P.....Hallowell
Atkins, Charles G..... ... Bucksport
Atwood, Fred .... Winterport
Averill, David C ..... Temple
Bailey, W. G..... ..... Freeport
Bennoch, John E..... .....Orono
Bickford, Lewis I..... Dixmont Center
Bisbee, George E ... .Auburn
Blanchard, Mrs. E. M.....Lewiston
Boardman, Samuel L..... .....Bangor
Briggs, John ....Turner
Burr, John . ...Freeport
Butler, Alonzo..... .....Union
Chandler, Mrs. Lucy A..... ...Freeport
Chase, Henry M., 103 Federal St., Portland
Corbett, Herman .... Farmington
Crowell, John H ....Farmington
Cummings, Mrs. Anthony ... ...Auburn
Dana, Woodbury S.....Portland
Dawes, S. H..... .....Harrison
DeRocher, Peter..... Bradentown, Fla.
Dirwanger, Joseph A..... ....Portland
Dunham, W. W. .. ..North Paris
Dyer, Milton... ....Cape Elizabeth
Emerson, Charles L... ....South Turner
Farnsworth, B. B ....Portland
Frost, Oscar F..... Monmouth
Gardiner, Robert H..... .....Gardiner
George, C. H..... .. ....Hebron
Gilbert, Z. A..... .....North Greene
Goddard, Lewis C. . .. . Woodfords
Grover, Franklin D..... .....Bean
Hackett, E. C..... .....West Gloucester
Hall, Mrs. H. A..... .....Brewer
Hanscom, John. . ... Saco
Harris, William M..... Auburn
Hoyt, Mrs. Francis..... ...Winthrop
Jackson, F. A... .....Winthrop
Keene, Charles S..... ..... Turner
Knowlton, D. H..... .....Farmington
Lapham, E. A ....Pittston
Lincoln, E. L ....Wayne
Litchfield, J. H.. ....Auburn
Litchfield, Mrs. L. K.....Winthrop
Lombard, Thurston M.....Auburn
Luce, Willis A.....South Union
McCabe, George L..... North Bangor
McLaughlin, Henry ....Bangor
McManus, John .. . . Brunswick
Merrill, T. M..... ...Sabbathday Lake
Mitchell, Frederick H..... .....Turner
Moody, Charles H ....Turner
Moore, William G.....Monmouth
Moor, F. A .... Waterville
Morton, J. A..... .. ..Bethel
Munson, W. M . ...Orono
Page, F. W..... .....Augusta
Parsons, Howard G.. .....Turner Center
Perley, Chas. I.....Cross Hill
Pope, Charles S. ....Manchester
Prince, Edward M . . West Farmington
Pulsifer, D. W .....Poland
Purington, E. F .....West Farmington
Richards, John T.....Gardiner
Ricker, A. S.... ....Turner
Roak, George M... ... .Auburn
Sanborn, Miss G. P..... ... Augusta
Sawyer, Andrew S.. .....Cape Elizabeth
Seavy, Mrs. G. M..... ....Auburn
Simmons, H. J. A..... ..... Waldoboro
Skillings, C. W.... .....North Auburn
Smith, Henry S..... .....Monmouth
Snow, Mary S..... ....Bangor
Starrett, L. F.. .. ..Warren
Stetson, Henry..... .....Auburn
Stanley, O. E..... . . ..Winthrop
Stilphen, Asbury C..... ....Gardiner

LIFE MEMBERS—*Concluded.*

Strout, S. F. ....West Falmouth
Taylor, Miss L. L., (Lakeside) Belgrade
Thomas, William W.....Portland
Thomas, D. S..... ... North Auburn
Thurston, Edwin.....West Farmington
Tilton, William S..... ..... Boston, Mass
Townsend, Mrs. B. T..... .Freeport
True, Davis P..... .....Leeds Center
True, John W..... New Gloucester
Twitchell, Geo. M..... ..... Augusta
Vickery, James .....Portland
Vickery, John..... .... Auburn
Wade, Patrick ....Portland
Walker, Charles S .... Penn
Walker, Elmer V..... .....Oxford
Waterman, Willard H..... East Auburn
Waugh, F. A .....Amherst, Mass
Wheeler, Charles E..... Chesterville
Yeaton, Samuel F.....West Farmington

ANNUAL MEMBERS, 1901.

Austin, Alfred ....Parkman
Austin, Chas.. ... .South Berwick
Beal, Mrs. Altana ....North Fairfield
Clark, Chas. H ... . Wells Branch
Copeland, Llewellyn ..... . Dexter
Davis, Fred ....Newport
Day, A. C.. ....South Turner
DeCoster, V. P .....Buckfield
DeCoster, Mrs. V. P.....Buckfield
Dudley, John W .....Mapleton
Dunn, A. L..... ... .Buckfield
Eastman, A. A..... ...Dexter
Edwards, R. G ....Brooks
Emery, Frank E.....Laramie, Wyoming
Fogg, Alvan H .... Rockland
Greenleaf, A. C..... .....Farmington
Haines, J. W ....Dexter
Hall, Chas. G .....Cedar Grove
Hayden, Chas. H..... . Dexter
Johnson, C. F .... Dexter
Jose, S. O..... ....Dexter
Leland, Will E.....East Sangerville
Libbey, R. H. . ...Newport
Libbey, Mrs. R. H . ...Newport
Litchfield, L. K..... .....Winthrop
Mathers, Mrs. A. C..... .....Rockland
Merchant, S. L.....Winthrop
Munson, W. M .....Orono
Nowell, F. E..... ....Fairfield
Phillips, W. H .....Hancock Point
Plummer, Stanley..... ....Dexter
Roberts, M. W..... ..... Brooks
Robinson, O. M... ....Dexter
Rowe, W. C ....Brooks
Spear, Mrs. Carus T... ..... Rockland
Stoddard, Mrs. Alma S..... Farmington
Titcomb, B. M ..... Farmington
Waterman, L. C.....Buckfield
Whittier, Phineas.....Farmington Falls
Wooster, E. W..... ..... Hancock

ANNUAL MEMBERS, 1902.

Adams, J. W ..... East Wilton
Alden, R ..... Winthrop
Allen, E. F..... .....Columbia Falls
Austin, Mrs. A. F.... .....Farmington
Bradley, Mrs. Myrtie E ....Vienna
Brown, Mrs. C. O ... .East Wilton
Campbell, David .....Cherryfield
Campbell, D. W .....Cherryfield
Clark, Chas. H ... .West Branch
Conant, S. E .... Buckfield
Day, A. C ....South Turner
DeCoster, V. P..... .....Buckfield
DeCoster, Mrs. V. P ... .Buckfield
Dudley, John W.... ....Mapleton
Dummer, Chas. G ....Weld
Eastman, A. A ....Dexter
Field, George W .....North Vienna
Furbush, Mrs. E. F .....East Wilton
Greenleaf, A. C ....Farmington
Greenwood, Emilie . ..... .Farmington
Hall, Chas. G ....Cedar Grove
Hiscock, Mrs. W. L .... .. Farmington
Holley, W. B ....Farmington
Jenkins, Mrs. Elmira .....Temple
Jennings, Mrs. R. B .....Farmington
Jewell, H. D .....7..... .....Farmington
Jordan, Ira ....Milbridge
Leland, Will E... .....East Sangerville
Libbey, R. H .... Newport
Libbey, Mrs. R. H .....Newport
Lincoln, E. L ....Wayne
Mayo, E. R..... .....Manchester
McAllister, Zacheus..... .. Lovell
McCleery, Robert .....Farmington
Merchant, S. L ..... Winthrop
Niles, S. H ....North Jay
Odell, Mrs. A. J... ....Farmington
Plummer, H. A ....Addison
Purington, Mrs. E. F .....Farmington
Ricker, H. C ..... Buckfield
Robinson, O. M. .. .. .Dexter
Rollins, Frank H.....Farmington Falls
Sampson, R. S ....Farmington
Simmons, Mrs. J. J.... .....Farmington
Small, E. C..... .. Cherryfield
Stetson, C. S .....Alta
Stewart, Mrs. A. M.. .....Farmington
Stewart, John ....Cherryfield
Tarr, Edward. ....Mapleton
Titcomb, B. M ....Farmington
Toothaker, L. P ..... Simpson's Corner
Tucker, Benj .....North Norway
Tufts, Laforest ....Farmington
Von Herff, B. .93 Nassau St., New York
White, Edward L ..... Bowdoinham
Whittier, Phineas.... Farmington Falls
Wilbur, Georgine ....Phillips
Willey, A. B ..... Cherryfield
Wiswell, M. H..... ...East Machias
Withington, Mrs. Chas..... ...Buckfield

ANNUAL MEMBERS, 1903.

Allen, L. L..... ....Fairfield
Blossom, L. H.....Turner Center
Bradley, Myrtie E..... ..... Vienna
Breed, W. O.... .... Harrison
Campbell, D. W.....Cherryfield
Day, A. C... ..... South Turner
Dingley, Mrs. P. G..... ....Auburn
Fairbanks, A. E .....North Monmouth
Fessenden, Francis .....Portland
German Kali Works ....New York
Goodale, G. C ....Winthrop
Guptill, W. T..... .Topsham
Hall, C. G ....Cedar Grove
Harding, Nathaniel ....New Sharon
Hathaway, W. S..... .....East Auburn
Johnson, H. E. .. .. Auburn
Jones, Mrs. Barnum .....North Auburn
Jordan, Ira .. ..Milbridge
Leland, W. E . ...East Sangerville
Libby, R. H ....Newport
Libby, Mrs. R. H ... . Newport
Lord, T. Merrill.....North Parsonsfield
Mayo, E. R... ....Manchester
McAllister, G ....West Lovell
Merchant, S. L... .....Winthrop
Merrill, A. L..... ... .North Auburn
Morrill, Stephen..... Lewiston
Nowell, F. E..... .....Fairfield
Payson, H. L .. ..Rockland
Phinney, C. S ... ...Standish
Roberts, J. A..... .....Norway
Smith, F. W . ...Rockland
Smith, Geo. R .... Augusta
Staples, Mrs. Arthur G..... ...Auburn
Tarr, Edward . .....Mapleton
Toothaker, L. P .....Simpson's Corner
Tucker, Benjamin..... ...North Norway
White, Edward L ... .Bowdoinham
Whitman, H. H.... .... ..South Turner
Whittier, Phineas .....Farmington Falls
Willey, A. B..... .....Cherryfield
Woodside, E. G ....Lewiston

ANNUAL MEMBERS, 1904.

Warren, Henry P ....Albany, N. Y

TREASURER'S REPORT.

		Dr.
Received from Treasurer 1902		$251 93
Jan. 1.	Interest Farmington National Bank	20 00
	Interest Merchants Bank Gardiner	3 00
	State stipend	1,000 00
	Interest Augusta Trust Co	42 35
	V. P. DeCoster, rebate on R. R. ticket	2 66
	Fees of annual members	42 00
	Fees of life members	20 00
	Balance due Treasurer	73 72
		$1,455 66

		Cr.
Jan.	By paid premiums awarded at Farmington	$342 50
	D. H. Knowlton, expenses as member Ex. Com. Augusta	17 20
	V. P. DeCoster, expenses as Ex. Committee at Augusta	7 95
	Z. A Gilbert, expenses as Ex. Committee	7 45
	C. A. Arnold, expenses as Ex. Committee	7 50
	R. H. Libbey, expenses as Ex. Committee	7 00
	D. H. Knowlton, sundry cash items, Cornish	22 16
	C. A. Arnold, expenses at Cornish	13 79
	V. P. DeCoster, expenses at Cornish	8 55
	R. H. Libbey, expenses at Cornish	13 75
	Z. A. Gilbert, expenses at Cornish	7 47
	F. W. Rane, services and expenses at Cornish	16 75
	D. H. Knowlton, salary	75 00
	Dick J. Crosby, expenses at Winthrop	45 50
	Louise Klien Miller, expenses at Winthrop	50 00
	Premiums awarded at Cornish	22 50
	Mrs. V. P. DeCoster, expenses at Winthrop	13 10
	W. M. Munson, expenses at Winthrop	15 10
	D. H. Knowlton, sundry expenses	16 10
	Burleigh & Flynt, printing	3 00
	C. A. Arnold, expenses to Harrison	19 75
	V. P. DeCoster, expenses to Harrison	13 30
	Z. A. Gilbert, expenses to Harrison	19 17
	D. H. Knowlton, expenses to Harrison	13 99
	W. F. Rane, expenses to Harrison	22 85
	Knowlton, McLeary & Co., printing	34 14
	D. H. Knowlton, postage	14 56
	N. Y. and Boston Calcium Light Co	3 00
	Chas. S. Pope, expenses	18 75
	Z. A. Gilbert, expenses at American Pomological meeting.	11 00
	D. H. Knowlton, postage, express, etc	29 41
	R. H. Libbey, expenses as Ex. Committee	11 14
	V. P. DeCoster, expenses as Ex. Committee	6 40

Jan.	By paid C. A. Arnold, expenses as Ex. Committee	$4 50
	Knowlton, McLeary & Co., printing	47 89
	Merrill & Webber, printing	7 00
	Julia Harris May, poem at annual meeting	5 00
	Z. A. Gilbert, paid labor at annual meeting	4 50
	Bliss Business College, writing certificates	6 40
	G. Harold Powell, travel and board at Auburn	44 85
	L. C. Corbett, travel and board at Auburn	43 95
	Wood, Robinson & Co., paper for tables	3 06
	D. H. Knowlton, postage	15 00
	C. A. Arnold, expenses at American Pomological meeting	19 00
	V. P. DeCoster, expenses at American Pomological meeting	8 95
	F. Bartlett & Son, bunting for tables	3 00
	S. T. Maynard, services as judge at Auburn	27 78
	C. L. Cushman, use of lantern, Auburn	8 00
	Abel F. Stevens, services at Auburn	20 00
	Emelie Greenwood, services as clerk, Auburn	7 70
	A. L. Lane, services as speaker, Auburn	9 14
	John W. Clark, services as speaker, Auburn	24 62
	Geo. H. Clarke, board of officers and speakers, Auburn	51 50
	Flavel R. Jordan, Jr., use of piano, Auburn	3 00
	E. F. Bonners, labor and trucking	16 50
	D. H. Knowlton, salary	75 00
	W. M. Munson, expenses at Auburn	5 45
	Deposit to credit of permanent fund	20 00
	Lillie B. Raynes, stenographer at Auburn	44 64
		$1,455 66

PERMANENT FUND ACCOUNT, 1902.

To stock First National Bank, Farmington	400 00
deposited Augusta Trust Company, Augusta	1,060 00
	$1,460 00

CR.

By 144 life members' fees	$1,440 00
Received George L. McCabe, North Bangor, membership fee	10 00
Mrs. G. M. Seavey, Auburn, membership fee	10 00
	$1,460 00

CHAS. S. POPE, Treasurer.

BUSINESS TRANSACTIONS.

MEETINGS OF EXECUTIVE COMMITTEE.

AUGUSTA, January 27, 1903.

On the vote in March, 1902, that 150 copies of the society's transactions be bound, the volume to consist of enough years' transactions to make a good sized volume, it was voted to instruct the treasurer to carry out said vote and that the volume consist of about 500 pages of the recent volumes of the society's transactions.

Voted, That our members of Congress be requested to support the bill, already passed by the Senate, appropriating two and one-half million dollars for the erection of a new building for the suitable housing of the agricultural department in Washington.

The committee considered it inexpedient at this time to ask for legislation requiring an efficient inspection of fruit.

For the protection of our State against the bringing in of infected and diseased nursery stock, it was voted that the legislature be requested to give passage to a law providing for the protection of trees and shrubs from injurious insects and diseases.

Voted, That the drafting of such a bill or law be referred to the president and secretary and that they be requested to present the same or cause the same to be presented to the legislature now in session.

Voted, To sell the refrigerator and case used heretofore for exhibition purposes to C. A. Arnold for $5.

Voted, That Mr. Gilbert be instructed to visit New Gloucester and have the exhibition outfit, stored there with John W. True, sorted and so far as the same may be of value to the society for

exhibition purposes, cause it to be packed and sent to R. H. Libbey, Newport, for storage.

Voted, That the treasurer be authorized to draw the interest on permanent fund and deposit the same for society's use.

As to work for the coming year it was voted as follows:

To accept the invitation of Mr. S. H. Dawes of Harrison to hold a field meeting at his place.

To hold a late winter meeting not later than March 15th, at such place as the president and secretary may decide.

To arrange for fruit and flower study if satisfactory arrangements can be made.

To hold the annual meeting sometime in the month of November prior to the 15th.

That if the funds of the society admit one or more additional meetings may be held.

Voted, To have 1,500 copies of Announcements and Premium Lists printed.

CORNISH, March 18, 1903.

Voted, To send representatives to the meeting of the American Pomological Society to be held in Boston next fall.

Treasurer's bond for 1903 was approved.

BOSTON, September 11, 1903.

Meeting of the executive committee held in an anti-room of Massachusetts Horticultural Society's building.

An invitation to hold the annual meeting with the University of Maine at Orono was presented.

President Gilbert stated that he was authorized to extend an invitation from the Auburn Board of Trade to hold the annual meeting in that city.

Voted, To hold the meeting in Auburn, November 10, 11, and 12, 1903.

The president and secretary were requested to ask the St. Louis exposition commission that the sum of $5,000 of the $40,000 appropriated by the State for a representation at the exposition, be set apart for installing and maintaining an exhibition of Maine fruit at the exposition, and that the same may be expended by the State Pomological Society.

AUBURN, November 10, 1903.

Appointed the following judges:

On Apples, single plates—Prof. S. T. Maynard.

On Collections—Abel F. Stevens.

On Pears—Chas. S. Pope.

On Canned Goods, Etc.—Mrs. V. P. DeCoster.

The secretary was invited to respond to the address of welcome.

In accordance with the vote passed by the committee January 27, 1903, the treasurer had 150 copies of transactions for the years 1897, 1898, 1899, 1900, 1901 and 1902 bound in cloth.

The secretary in accordance with vote passed at same meeting sent a copy of vote relating to the appropriation for a new agricultural building to our members of Congress.

A bill was drawn up by the president and secretary to provide for the protection of the State against the introduction of infected and diseased nursery stock. It was afterwards presented to the legislature, President Gilbert and Dr. Geo. M. Twitchell appearing before the committee to whom it was referred, and the legislature passed the same. This law was published in the secretary's portfolio of last year's transactions.

President Gilbert visited New Gloucester, and had whatever of the exhibition paraphernalia he considered of any value to the society forwarded to R. H. Libby, Newport, for storage.

Other doings of the executive committee are referred to in the secretary's annual report, contained in this volume, and the transactions of the society.

PUBLIC MEETINGS.

The spring meeting of the society was held in Cornish, March 18, 1903. The morning session was devoted to the assignment of fruit and a short talk on the "Varieties to Plant," by President Gilbert. The program for the afternoon session consisted of short talks, Fertilizing the Orchard, V. P. DeCoster; What the Market Calls For, C. A. Arnold; Small Fruits for the Home, Chas. S. Pope; Small Fruits for the Market, R. H. Libbey, and a closing paper by Prof. F. W. Rane of Durham, N. H., on Definiteness in Horticulture. The evening session the exercises

were give up to Lantern Talks on Horticultural Topics, Culture and Care, by D. H. Knowlton, and Horticultural Work at the N. H. Experiment Station, by Prof. F. W. Rane. The meeting was preceded by a severe storm and the traveling was very bad, and in consequence the attendance was not large, but those present seemed much interested and enjoyed the meeting.

THE HORTICULTURAL SCHOOL.

The horticultural school was held in Winthrop, May 14 and 15, 1903. The instructors for this school were Mrs. V. P. DeCoster of Buckfield; Mr. Dick J. Crosby, Washington, D. C.; Prof. W. M. Munson, Orono; Miss Louise Klein Miller, Day-

Pupils of Winthrop Schools on the way to Horticultural School.

ton, Ohio. The exercises were held in the town hall and were generally attended by the schools. The evening sessions were of more general interest and good audiences were present. The work of Miss Miller was especially valuable and on the street, the platform and the home, she made her influence for beautifying the home and the town felt. Since this meeting a Village

Improvement Society has been organized in the town and all reports indicate that it is rendering the town a most valuable service.

FIELD MEETING.

In accordance with the wishes of many of the members of the society, arrangements were made for a field meeting with Mr. S. H. Dawes of Harrison, July 2, 1903. The program for the occasion consisted of an examination of Mr. Dawes's fruit gardens and orchard, a lunch during the noon hour, followed by remarks from Pres. Gilbert, Secretary Knowlton, J. W. True, Chas. S. Pope, Mrs. V. P. DeCoster, Mr. W. O. Breed, Rev. M. Whitman and others. Pres. Gilbert's opening remarks were responded to by Mr. S. H. Dawes, and the exercises closed with an address by Prof. F. W. Rane. Excellent music was furnished by local talent.

Before separating, Mr. DeCoster offered the following resolutions, which were unanimously passed:

Resolved, That the Maine State Pomological Society and other visitors present hereby tender sincere thanks to Mr. S. H. Dawes, his family, and his local friends for the magnificent reception he has given us at this, the first field meeting held by the Pomological Society.

Resolved, That we extend to Mr. Dawes our hearty congratulations for the wonderfully successful results he has attained and so kindly shown us today.

Resolved, That as a parting expression of our good will we extend to Mr. Dawes and his family our best wishes for many years of pleasant and peaceful enjoyment of the delightful influences with which he has surrounded his charming home.

THE ANNUAL MEETING.

The annual meeting was held, by invitation of the Auburn board of trade, in City hall, Auburn, Nov. 10, 11 and 12, 1903. The program was as follows:

TUESDAY EVENING—An informal reception by the Auburn board of trade.

OPENING SESSION—Prayer by Rev. Fred M. Preble, D. D., Auburn; address of welcome by Hon. Geo. C. Wing, Auburn;

response by D. H. Knowlton, Farmington; annual address by Pres. Z. A. Gilbert, North Greene.

Wednesday Afternoon—Practical Results of Fruit Storage by the Grower, John W. Clark, North Hadley, Mass.; How to Handle the Apple for Cold Storage, G. Harold Powell, Washington, D. C.

Wednesday Evening—Civic Improvement—What Has Been Done in Other States, Mrs. Emma Dow Armstrong, President Maine Federation Women's Clubs, Lewiston; Civic Improvement Locally, Geo. H. Clarke, Auburn; Home Decorations, Prof. L. C. Corbett, Washington, D. C. Music for this session furnished by Mr. Jordan and ladies of Auburn.

Thursday Morning—Annual Meeting; report of treasurer; report of secretary; report of special committee on sweepstakes prize, Dr. G. M. Twitchell, Mrs. V. P. DeCoster, Mrs. Lucy A. Chandler, referred from last annual meeting; amendment to Sect. 1, Art. II, of by-laws; election of officers; miscellaneous business.

Thursday Afternoon—Orchard Fertility: Results from Use of Chemical Fertilizers, S. H. Dawes, Harrison, C. S. Phinny, Standish; Results from Barn Manures, V. P. DeCoster, Buckfield; Results from Tillage and Cover Crops, Prof. W. M. Munson, Orono; Fruit Packages: The Barrel and the Box, D. H. Knowlton; Other Packages, R. H. Libbey, Newport.

Thursday Evening—Poem, Miss Julia H. May, Auburn; Chrysanthemums, Abel F. Stevens, Wellesley, Mass.; Among Fruits and Flowers, Prof. A. L. Lane, East Fairfield. Music for the evening furnished by the Lotus Quartette.

The chairman of the committee on a Sweepstakes Prize offered the following report:

Your committee to whom was referred the subject of an appropriate recognition for those winning the sweepstake prizes, has attended to its duties and presents the following report.

We believe that the time has arrived when this society may well recognize the efforts of individual growers in making extensive exhibits of many varieties and of such excellence and would recommend that in addition to the money prize awarded, this

society provide itself with an attractive diploma of proper size and quality and that one of the same be presented to the winner of the sweepstake prize yearly.

G. M. TWITCHELL,
MRS. V. P. DeCOSTER,
MRS. L. A. CHANDLER,
Committee.

Voted, That said report be accepted.

Voted, That the selection of a design and the proper wording of the award be submitted to the same committee for their action.

The committee on president's address, by its chairman offered their report as follows:

Your committee to whom was referred the address of Pres. Gilbert and report of Sec. Knowlton, would submit the following:

That this society expresses itself in decided terms of condemnation over the selection of the log cabin as the Maine building at St. Louis as unfortunate and inappropriate for the reason that no matter how artistic, it will speak only of the forest and in no sense can it represent the social or industrial life of the State of Maine or the culture and enterprise of its inhabitants. Maine is today a State of farms, villages, towns, cities and manufacturing and not a forest.

Representing the fruit growers of the State, and an industry exceeding two million dollars annually, we believe a serious injury has been done through the failure of the St. Louis Commission to make reply and grant the application of this society for an adequate appropriation by which a fair representation of Maine fruit might have been made at St. Louis. As the time has now passed it is well for the people of the State to know that the failure in no way attaches to the officers of this society or our fruit growers.

We believe that the press of the State can aid materially our fruit industry by frequently calling attention to the fact that our domestic consumption of fruit is of far greater importance than the foreign trade, as out of forty million barrels grown only about three million are exported annually. The superior quality of this fruit and its possible increase in the future are subjects of vital interest and may well form the basis for frequent editorials.

It is most important that the statistical work to which attention is called by both the president and secretary be taken up and facts and figures regarding the planting of orchards and especially the volume of fruit produced be made a subject of authentic record year by year. And we urge upon the executive committee that definite measures be adopted by which these records may be obtained.

We recommend that the executive committee investigate the subject of packages for marketing boxes for half bushel, bushel and half barrel, ascertain cost of manufacture to insure lightness and strength and exhibit same at future meetings thereby helping to an uniformity of shipping packages, and that the subject of legislation to require the use of such uniform packages be investigated and report made at the next annual meeting of this society.

G. M. TWITCHELL,
C. S. PHINNEY,
C. S. STETSON,
DAVID W. CAMPBELL,
W. O. BREED.

Voted, That the report be accepted.

Voted, To amend Section 1, Article II, of by-laws, so that said section when amended shall read as follows:

That the elective members of the executive committee upon the adoption of this amendment be elected one for one year, one for two years and one for three years, and that thereafter one member shall be elected annually for three years.

The following officers were elected for 1904:

President—Z. A. Gilbert, North Greene.

Vice Presidents—D. P. True, Leeds Center; C. H. George, Hebron.

Secretary—D. H. Knowlton, Farmington.

Treasurer—Charles S. Pope, Manchester.

Executive Committee—President and secretary, *ex-officio;* R. H. Libbey, Newport, for one year; V. P. DeCoster, Buckfield, for two years; C. A. Arnold, Arnold, for three years.

Trustees—Androscoggin county, A. C. Day, South Turner; Aroostook county, John W. Dudley, Mapleton; Franklin county,

E. F. Purington, Farmington; Cumberland county, John W. True, New Gloucester; Hancock county, E. W. Wooster, Hancock; Kennebec county, E. A. Lapham, Pittston; Knox county, Alonzo Butler, Union; Lincoln county, H. J. A. Simmons, Waldoboro; Oxford county, J. A. Roberts, Norway; Penobscot county, A. A. Eastman, Dexter; Piscataquis county, W. E. Leland, Sangerville; Sagadahoc county, A. P. Ring, Richmond Corner; Somerset county, Frank E. Nowell, Fairfield; Waldo county, Fred Atwood, Winterport; Washington county, D. W. Campbell, Cherryfield; York county, C. A. Hooper, Eliot.

Auditor—Dr. Geo. M. Twitchell, Augusta.

Member of Experiment Station Council—Charles S. Pope, Manchester.

REPORT OF THE COMMITTEE ON RESOLUTIONS.

Your committee would submit the following as representing the sentiments of the society concerning the very successful meeting now closing:

Resolved, That the Maine Pomological Society recognizes and appreciates the courtesies extended by the Board of Trade and the citizens of Auburn in their untiring efforts to make the visit of the society a successful and profitable one; and that the thanks of the society are hereby extended.

Resolved, That the society hereby extends to the press of the State which has so generously advertised and reported its meetings our gratitude for these courtesies.

Resolved, That the thanks of the society are hereby extended to the Maine Central, Grand Trunk and Portland & Rumford Falls Railroads for excursion rates granted on account of the meeting.

Resolved, That the efforts of Mr. Abel F. Stevens of Massachusetts in making an excellent display of chrysanthemums of the finest quality is appreciated, and that the thanks of the society be extended to Mr. Stevens.

Resolved, That the thanks of the society are hereby extended to the University of Maine for the excellent exhibit of flowers, fruits and photographs of the college buildings which added greatly to the attractiveness of the exhibit, and that the society

recognizes and endorses the work which the University and the Experiment Station are doing for the fruit interests of the State.

Resolved, That the society recognizes the grand work which the U. S. Dept. of Agriculture is doing for horticulture, and especially its efforts to solve the problems of fruit storage and shipment and the trucking interests of the country; and further that the thanks of the society are extended to Professor L. C. Corbett and Professor G. Harold Powell for their part in making the program of this meeting a profitable one.

Resolved, That the thanks of the society are extended to Mr. Jordan and the members of the Lotus Quartette for the excellent music with which this meeting has been favored.

The resolutions were accepted by a rising vote.

Respectfully submitted,

W. M. MUNSON,
MRS. V. P. DeCOSTER,
CHAS. S. POPE.

PAPERS, ADDRESSES AND DISCUSSIONS OFFERED AT VARIOUS MEETINGS OF THE SOCIETY.

INVOCATION.

By Rev. F. M. Preble of Auburn.

Our Father who art in heaven, it seems to us very fitting that we should pause a moment in the exercises of this day and lift our thoughts and our hearts to thee. We feel that the most appropriate language of our lips should be the language of a Psalm, and the Psalm of Thanksgiving. In the midst of the things which surround us, upon which our eyes look at the close of the harvest season, we should come with the song of praise and thanksgiving, the glad song of the return of the harvesters. "Thou crownest the year with thy goodness, and thy paths drop fatness. They drop upon the pastures in the wilderness. The pastures are clothed with cattle. They also shout, they also sing."

We thank thee this morning for the close of the year and for the exhibitions of our Father's continued prosperity and goodness to us, His children. We feel that each son and daughter of our blessed and well favored commonwealth may say, "My lines have fallen to me in pleasant places. I have a goodly heritage." Surely every child of this beloved State may feel that he indeed has a goodly heritage; and for all that has come to us in the past we feel profoundly thankful.

And we are thankful this morning for the exhibition that is being able to be made here at this time; the fruits of the field, the flowers of the garden, the products of the orchards, are showing the goodness and the mercy and the kindness of our God. We pray thy blessing to rest then upon this exhibition and upon the councils that are here had. Be with the officers of

this society, be with all that may be said so that it shall tend to the prosperity, the increase of prosperity in our State, that we may become with the growing years more and more a State where thy favors rest. We pray thee, our Father, that thou wilt indeed be with every session of this convention.

We remember with a great deal of gratitude, some of us men and women who have been called from the fields, the pastures and the orchards, we remember the early days. We pray thy blessing, then, to rest upon the husbandmen, these men and women who come from the fields, come from the places that are nearest to the heart of God for they are near the heart of nature, these men and women who toil, labor and live in the fresh, beautiful country, among the orchards and vineyards and pastures and fields. Help us to learn there where thou hast placed us the lesson of faith and contentment, to hear amidst the flowers as they bloom the teachings of the Divine Master, "Consider the lilies of the field, how they grow, they toil not, neither do they spin." Help us to learn the lesson of abiding in the Divine Master. As the branch abides in the vine, so may we learn to abide in thee. And help us in all our lives to yield the peaceable fruits of righteousness, love, joy, peace, longsuffering, gentleness, goodness, faith, meekness, temperance,—against such there is no law. And so by the means of culture and the means of information that shall come from this gathering of thy servants and thy husbandmen here in our city, may it tend to the increase of contentment and prosperity and peace throughout our borders.

We ask it all in the name of Him who has taught us to say "our Father." Amen.

ADDRESS OF WELCOME.

By Hon. George C. Wing of Auburn.

I must confess that my feelings have been moved and stirred by the prayer that has been offered here. I was taken back a great many years when I, a farmer's boy, was taught those lines of poetry which run something like this:

"The Harvest Giver is their friend,
The Maker of the soil,
And earth, the mother, gives them bread
And cheers their patient toil."

Auburn is distinctively a city of homes, and in her homes hearty hospitality and welcome are ever present for the friend and visitor. She feels an honest pride when permitted to draw the latch and open wide her gates to receive those who are willing to devote their time in showing their respect by paying her a visit. She has been often honored by the presence of distinguished guests, yet she has never been flattered by a call from an organization more respected and more welcome than the State Pomological Society, and now, in her behalf, I bid you, who represent that visiting organization, a welcome to Auburn most cordial and sincere, and at the same time I want to assure you that the interest of all our citizens in this event is something more than usual, and is in no sense artificial or perfunctory.

The benefits to the public and to the State that are directly traceable to your organization are appreciated throughout our entire domain. The rapid and pronounced improvement in the character, quality, variety and amount of fruits grown in Maine, are reasons to convince the most skeptical that a society made up of influential, practical and enterprising fruit growers, is of great and positive value. The assembling together of so large a number of energetic, active members, the discussion of topics of common interest, the comparison of varieties, of methods, of experiments and results, together with that spirit of friendly emulation which is engendered by an exhibition of the character produced by your society, cannot fail to produce results that are far reaching in character, and valuable in outcome.

There is another consideration, which underlies all others. It is your direct dealings with nature. The immediate favors which you obtain from her, growing out of your close and intimate relations, while an inspiration to you, are at once the admiration of every citizen, no matter how he may be employed. The fact that you are able to produce these beautiful fruits and flowers, are results that while stimulating and increasing your self respect, make you the friends of all. The rest of the world, otherwise employed, are obliged to look to you as obtaining from first hands the product of your labor, and ever appreciate results of efforts made in their behalf.

To you as an educated, experienced and painstaking class, I only express the desire of every good citizen when I wish you every success, and in addition a suitable expression of appreciation from all for the great work in which you are engaged, and again assuring you of a most hearty welcome in Auburn, and of my great pleasure personally in voicing the cordial feeling of her citizens, I bespeak for your exhibition here a greater measure of success than it has ever had elsewhere, and a continuance of the great public favor it now enjoys.

I must say that I am surprised at the extent and the variety of your exhibition. It is a revelation to me. I expected a great deal but my expectations are very much disappointed. This meeting cannot fail to have the very best possible results. It should have the attention, the support, the endorsement and the encouragement of the people of this State. It has it now in a great measure but it should be universal.

The State owes you a great obligation and they should not be slow in expressing it. These meetings will be productive of great results. I remember attending about the first of these meetings. The exhibition today is, I should say, ten fold what it was at its beginning. This should encourage all, and in connection with the fruits, the beautiful flowers that are exhibited here are a great assistance and a great help in every direction, to uplift, hold up and continue the moral sentiment of the community. That which is beautiful gives an inspiration that is lasting and desirable to all our citizens, and I personally want to thank you, each and every one of the members of this society, in my own behalf aside from what I say representing the city of Auburn, for your great exhibition here today.

RESPONSE TO ADDRESS OF WELCOME.

By D. H. Knowlton of Farmington.

It was an unexpected pleasure to me that the executive committee conferred at their meeting last evening in inviting me to respond to the words of welcome so graciously extended by our friend Judge Wing, on behalf of the board of trade and the good people of Auburn. I am very glad to say a few words because in saying them I hope that I may not only express somewhat the measure of our gratitude for the cordial reception given us, but also give you here and there an idea or two in connection with the great industry which the Pomological Society represents.

Now the occasion for which we have assembled here is the 31st annual meeting of the society. For some reason, I don't know why, an annual meeting has never been held in either Auburn or Lewiston. It has been held once in the town of Turner, and that is the only instance in which it has been held in the county of Androscoggin. And I can assure Judge Wing and the members of the board of trade whom he represents on this occasion, that we are delighted to be here, and we are delighted to be here because we can show such grand results along the line of fruit culture in the State of Maine.

We had some difficulty in making up our program—that is, some embarrassment in making it up—because when we came to sit down and talk it over, and talk over what appeared to be the needs of the State, we were almost appalled at the magnitude of the crop of apples which we were harvesting here in the State of Maine. And do you know that crop of apples is going to measure fully a million barrels? It is an item of great importance, especially in a year like this when the frost came and froze to death so many things the farmers had counted on for a few dollars. Now we were appalled, so to speak, because we had gone perhaps about far enough in encouraging people to plant trees and to cultivate them, because we had got all this crop on our hands and what were we going to do with it? It was a serious question this year especially, because we had no storehouses in the State to speak of, and another thing we didn't know how we were going to put our apples up—couldn't get any barrels,

haven't got enough now in the State to contain the apples. So we were embarrassed along the line of making up this program, and we decided that we should very largely give prominence to the marketing of the fruit, and to the various manipulations of the fruit that lead up to the marketing. So as one of the chief considerations we have put storage first, and we have called from the Agricultural Department a man thoroughly conversant with the commercial interests of storage, and a practical man from Massachusetts who has a large storehouse of his own and is operating it very successfully, and I am sure you will be satisfied when you come to hear him that his plan is a practical one and one of the best plans for storage in Maine which can be adopted. Last evening in the very pleasant entertainment which was given in honor of our presence here, one of the speakers made the statement that here in Auburn, concentrated in your various moneyed institutions there was more than ten million dollars. Now it has occurred to me that if some of that ten million dollars could be utilized in a system of storage of fruit along the lines of our various railroads here, that Lewiston and Auburn might be made the center of an immense fruit business that would represent a large part of the State.

Then going a little further than that. We were told last night of the new power which is being developed, so that some 10,000 horse power that in years past has been running wild down the Androscoggin river will be soon available for manufacturing purposes. Well, now, why cannot some portion of that be put into the manufacture of barrels and boxes and things of that kind, that will not only help the people who put in the capital but also help the county and the State at large? I sincerely hope that out of this meeting and out of this discussion something of that kind may be developed, and for one I should be glad to see its home in this beautiful city of Auburn.

The export of apples made for the year 1902 from the State of Maine, and by export I mean apples that are sent across the Atlantic, was over 500,000 barrels. So that the measure of the crop last year must have exceeded quite a good deal 500,000 barrels. From these figures I conclude that we are entirely safe in placing the crop this year at a million barrels.

Now I wish, sir, again to express our full appreciation of your numerous courtesies, and I also wish to thank the representa-

tives of the press for the work which they have put into this meeting. I say this at the opening of the meeting because they have done everything that we have asked them to, and they have even done a great deal more to call the attention of the public to this meeting, and to them we owe much for the success of this occasion. And I am sure, sir, that with the united efforts of your board of trade and your people here, we shall have one of the grandest and most successful meetings that has ever been held in the State, and I am sure we shall go from Auburn feeling happy over our visit and grateful to you and your people for your very cordial hospitality.

ANNUAL ADDRESS.

By Z. A. Gilbert, President, North Greene.

Another year of experience in the fruit garden and orchard has brought us together again in annual convention, and with it lays the formality of an opening address from your president. A knowledge of fruit growing in all its relations is not a simple acquirement. There is always something more just ahead—a little further on—that invites attention, a knowledge of which will give its possessor better command of the situation. So whatever knowledge the individual or an association may acquire they never can reach a point where they will "know it all." Study and investigation must ever continue.

In approaching the fruit industry from the standpoint of business success we at once run up against two great factors or divisions of the industry, namely, production and selling. From this standpoint while production is first in order it is certainly of no more importance than is the sale of its products after produced. It is the sale that brings compensation. In the opening of the annual convention one year ago it was there claimed that in our public exercises, and in our individual attention to the business, we have been giving more of study and more of attention to production than to the disposal of the fruits of our efforts after they were in our possession. The situation is not yet essentially changed. There is still a call, a necessity, in fact, for greater

efforts to be put forth in working up the market side of our fruit industry. Knowledge has given us such control that production, great as it now is, has but just begun. The people want fruit. How shall we get it to them so that the cost to them will not be greater than the demand can bear, and at the same time the compensation to the grower be such as to stimulate production? These—not production—are the great problems of our fruit industry at the present time calling for attention.

It has generally been accepted that the value of our leading commercial fruits was chiefly controlled by the prices our surplus would sell for in foreign markets. Two years ago this society took measures to keep its members and growers in general posted on the extent and condition of the crop in our country at large, that from such knowledge they might draw conclusions to aid them in deciding upon the best time to dispose of their crop. The present season, without official sanction, your president determined to leave no opportunity unimproved to study the market outlets and the crop of fruit with the view to learning how closely demand and supply control the market prices, and also along with this study the best time for Maine growers to sell.

In the pursuance of this study I have gone far enough to be ready to say that it is a great subject and involves many factors. No man, grower or buyer, single or in association, is big enough to grasp all these factors in this broad fruit-growing country of ours, and determine their full bearing, as affecting the prices fruit ought to sell for. With all the organization that can be effected I question whether it is possible to get any nearer a solution of the problem than we are at the present time.

The people of this country are using up enormous quantities of fruit. It would be rare indeed if a year should ever occur when there is an equally full crop in every locality. There will be some section, some nook or corner where the crop is a failure. Yet those people will not go without fruit. Hence there will be an unlooked for draft from an unexpected quarter to fill that vacuum. These vacancies cannot always be foreseen was their demand measured in extent. An apt illustration, and on a broad scale, is met this year: the crop of fruit in the near-by states of Massachusetts and New Hampshire this year was light. Massa-

chusetts is a great consuming state. This condition which no one foresaw till it was upon us has given an opening for a vast amount of our choice Maine fruit at extremely liberal prices, and has put many hundred thousand dollars into the hands of our growers that otherwise they never would have realized. And the end is not yet—it has cleared the way of a glut of perishable fruit, leaving the trade in the later keeping sorts open to a healthy traffic.

All of us have known of the great "Ozark apple region" in Southern Missouri and Northern Arkansas—the land of the "Great Red Apples," where orchards have been planted in thousand-acre multiples, and fortunes made in the millions. This year the crop is comparatively light in that important section. The vast stores of York Imperials, Ben Davis, and Johnathans, formerly drawn from that fruitful locality to fill the storehouses of the great cities of the Mississippi valley are not forthcoming. This is another factor serving to stiffen the trade, over which, up to the present time, dealers have not seen it for their interest to public gossip.

Again, there can be no question but there is a general shortage of fruit in European countries where so much of our fruit finds a market. Never in the history of the trade has there been so clean a market abroad at fairly paying prices for such quantities of our surplus as thus far this season.

Further, and the last that space and time will allow of mention the shortage of packages has held the trade at bay. The market could not be choked for the reason there were no more barrels to put them in.

These are the principal factors, that with an immense crop of fruit on hand seeking a market, and the growers crazy to sell, have served to hold an open market free and clear of panic prices, and now quite likely to continue so long as these forces hold control. Better far medium prices and a steady demand than premium prices followed by panic and losses.

Thus it is seen that the distribution of fruit is the greater problem before growers at the present time, and it may well receive chief deliberation at your hands. The production of fruit has but just begun—in fact is in its infancy. So, too, the consumption of fruit is enormous. Where the fruit shall come from and how it shall be placed before consumers, and the producers

retain a fair share in the combine is the great problem before us. This fact must never be overlooked, that DOMESTIC CONSUMPTION IS A FAR GREATER FACTOR OF THE PROBLEM THAN THE FOREIGN TRADE.

In accordance with the action of the society at the annual meeting a year ago the officers kept an eye out on the proposed State appropriation in aid of a representation of our State at the St. Louis Exposition in 1904. As soon, therefore, as the legislature at its extra session passed the forty thousand dollars appropriation for that purpose your executive committee made application for a part of the appropriation to be used in aid of an exhibition of Maine fruits at that exposition. The secretary for the commission acknowledged the receipt of the application with the statement that it would be placed before the commission. Up to the present time not one word has been heard from the commission in regard to the application. The plans of the exposition commission in regard to the expenditure of the very respectable appropriation are well known to all. Forty thousand dollars to certify to visitors to the great exposition that Maine is a wilderness and game its principal production and hunting its chief industry! Shades of the fathers looking down upon us in this enlightened year of 1903—but I forbear and stop right here!

"The working system of our society is well organized and in good order. But there is room for more gearing.

"(1.) There should be a statistical attachment that would give us a better knowledge of the extent and increase of planting, and also more definite and reliable knowledge of the actual crop from year to year.

"(2.) There should be more of recorded experiments, carrying the weight of recognized authority. I respectfully raise the question, whether our fruit industry is getting the aid from the Experiment Station that its importance rightfully calls for.

"(3.) There is also pressing need for annual and continued authoritative attention to varieties, new and old, as a guide to beginners in the business. There is too much mistaken planting."

These suggestions I lay before you at this time for your consideration, and for you to take such action upon as it may appear their importance calls for. Congratulating the society on

its standing at the present time, and on the extent and merit of the exhibition it has drawn together on this occasion, I announce the convention now open for further business.

THE APPLE IN COLD STORAGE.

By G. Harold Powell, Pomologist in Charge of Fruit Storage Investigations, U. S. Department of Agriculture.

(The following is an outline of an illustrated talk by Mr. Powell on the above subject.)

There has been a remarkable development in commercial apple growing in the United States within the last 30 years following the opening of the interior of the country by the transcontinental railway, and by more recently completed lines. Apple culture at the present time is no longer an infant industry but it ranks as a highly specialized form of American agriculture. In 1900 there were more than 200,000,000 apple trees in the United States which yield from 40,000,000 to 60,000,000 barrels of fruit in a normal season. In the decade from 1890 to 1900 about 80,000,000 apple trees came into bearing or an average annual increase of nearly 7 per cent. during that period.

Nature does not produce her crops uniformly throughout the year, and unless there is some means of equalizing the distribution of the crop temporary gluts are bound to follow in the markets. Not long ago the apple crop had to be sold quickly after harvesting near the centers of production to prevent excessive waste from decay. The quantities received were often so great that the large markets were congested at the height of the season when enormous amounts of fruit were sacrificed for less than the cost of freight. At the same time the supply in many of the larger distant cities and in most of the smaller interior towns, was unequal to the demand, while all of the markets were practically barren of apples during a greater part of the year. The danger from gluts in the fruit market, as in every other industry, is reduced as we master the art of handling the temporary supply by storing it and distributing it at home and abroad in time of greater need.

The cold storage business has developed largely within the last 15 years, and in its broadest economic relation, it is destined to equalize the distribution of fruits, and to increase the demand for them both in domestic and foreign markets. It holds the same relation to the fruit industry that the great railroads bear to the older industries, such as grain, cotton and tobacco. Accurate statistics concerning the magnitude of the cold storage warehousing business are difficult to obtain, but it is probable that there are not less than 600 houses distributed throughout the country that are devoted in a greater or less degree to fruit storage.

The following figures represent the number of barrels of apples held in the United States in cold storage about December 1st of each year since 1898, and give a conception of the magnitude and growth of the apple storage business as a whole:

APPLES IN STORAGE ABOUT DECEMBER 1, 1898-1902.

Date.	Barrels in cold storage.	Barrels in common storage.	Date	Barrels in cold storage.	Barrels in common storage.
1898.....	800,000	400,000	1901.....	1,771,200	138,600
1899	1,518,750	634,500	1902.....	2,978,050	1,236,750
1900.....	1,226,900	794,000			

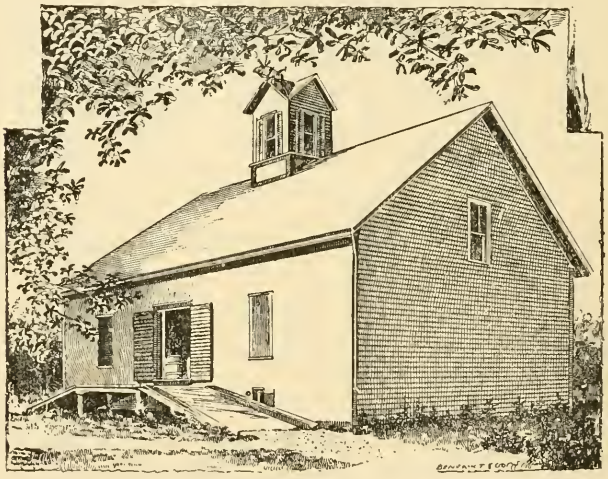
There are many practical difficulties in the cold storage of apples and these difficulties arise through lack of information concerning the principles which govern the production of the fruit in the orchard and the effect of various conditions of growth, of the different commercial methods of handling the crop in the orchard and in transit, and the treatment of the fruit during transportation and storage, on its vital processes. This condition leads to frequent misunderstandings between the warehouseman, the fruit grower, and fruit handler which might be avoided and the condition of the fruit storage business improved if there was a clear understanding of the principles of fruit growing in their relation to the ultimate keeping quality of the fruit itself.

The United States Department of Agriculture has been investigating many of these problems during the last two years,

and I desire to present a few of the practical results that have been emphasized by our investigations.

INFLUENCE OF TEMPERATURE ON THE KEEPING QUALITY OF THE FRUIT.

A fruit is a living organism in which the life processes go forward more slowly in low temperatures. When the fruit naturally reaches the end of its life, it dies from old age. It may be killed prematurely by rots which lodge on the fruit before it is picked or sometime afterward. A cold temperature is designed to arrest the ripening processes and thereby to pro-



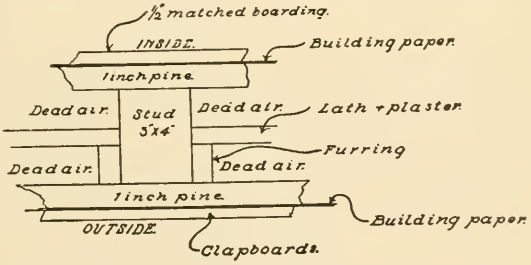
A VERMONT APPLE STORAGE HOUSE.
From Prof. F. A. Waugh's "Fruit Harvesting, Storing, Marketing," by courtesy of the Orange Judd Company, New York.

long its life history. It is designed also to check the development of the diseases with which the fruit is affected, but it cannot prevent the ripening of the fruit nor the slow growth of some of the diseases. The lower the temperature in which the fruit may be safely stored, the more nearly are the ripening processes stopped. In the investigations of the department, apples have been stored in temperatures ranging from 31 to 36° and it has been found that a temperature of 31 to 32° is more efficient in checking ripening than a higher temperature, and that the quality of the fruit and its other characteristics are in

no way injured by the lower temperature in comparison with the higher one. The low temperature also retards the development of scald, and the fruit on leaving the storage house stands up for a longer time on account of its being in a less mature condition.

INFLUENCE OF DEGREE OF MATURITY OF THE FRUIT.

In recent years there has been a tendency to pick the apple crop relatively earlier in the season than formerly. It is quite generally supposed that the longest keeping apples are not fully developed in size of maturity, and that the most highly colored fruit is less able to endure the abuses that arise in picking, packing and shipping. There are many economic factors which have influenced the harvesting time of the apple crop. A large pro-



Section Showing Wall of the Apple Storage House.

portion of the crop is purchased in the orchard by comparatively few apple dealers, and with the growing scarcity of farm hands and other labor, it is often necessary to begin picking relatively earlier in the autumn to secure the crop before the fall storms or winter months set in. The great increase in freight traffic has overtaxed the carrying capacity of the railroads and has influenced the apple dealers to extend the shipping season over the longest possible time in order to avoid congestion and the delays in shipping the fruit. In localities where the entire crop is sometimes ruined by the bitter rot after the fruit is half grown, the picking is often begun early in the season in order to secure the largest amount of perfect fruit.

The investigations indicate, however, that the immature and partly colored fruit has not always the best keeping quality. On the other hand an apple that is not overgreen and which has attained full size and high color, but is still hard and firm when

picked, equals the less mature fruit and often surpasses it. The more mature fruit is superior in flavor and texture, and is often more attractive to the purchaser and therefore of greater money value. It retains its plumpness longer and is less subject to apple scald. If, however, the fruit is not picked until overripe it is already near the end of its life history and will deteriorate rapidly unless stored soon after picking in the low temperature.

The experiments indicate that so far as maturity is concerned, the ideal keeping apple is one that is fully grown, highly colored, but still hard and firm when picked. Apples that are to be stored in a local cold storage house to be distributed to the markets in cooler weather may be picked much later than fruit requiring ten days or more in transit, but the use of the refrigerator car makes the picking possible when the fruit must be in transit for considerable time in warm weather in reaching a distant storage house.

It has been found that there is a close relation between the degree of maturity of the fruit when picked and its subsequent susceptibility to scald. Apple scald is one of the most serious difficulties with which the fruit storer has to contend. The nature of the trouble is not well understood, but it is supposed to be caused by a ferment called enzyme. It is not a contagious disease and is in no way connected with the action of parasitic organisms, such as mould or bacteria. It appears to be closely connected with the changes that occur in ripening after the fruit is picked, and is most injurious in its effects as the fruit approaches the end of its life.

The scald always appears first on the green or less mature side of an apple. The portions grown in the shade, and under-colored are therefore most seriously affected. When the apple crop is picked before it is matured the fruit is more susceptible to scald than it would have been later in the season, as the more mature and more highly colored fruit is less susceptible to injury. The relative susceptibility of immature and more mature apples is brought out in the following table:

SCALD ON MATURE AND IMMATURE APPLES.

Variety.	Locality grown.	Mature, well colored.	Immature, partly colored.
		Per cent.	Per cent.
Baldwin	New York	3.1	29.2
Ben Davis	Illinois	2.6	15.8
Ben Davis	Virginia	13.1	41.6
Rhode Island Greening	New York	25.4	43.4
Winesap	Illinois	0.2	31.8
Yellow Newtown	Virginia	2.3	9.4
York Imperial	Virginia	2.0	18.2
Average		6.9	27.0

In the practical handling of orchards the fundamental corrective of scald lies in practicing those cultural and harvesting methods that develop maturity and a highly colored fruit. The picking of the fruit when too green, dense-headed trees that shut out the sunlight, heavy soil, a location or season that causes the fruit to mature later than usual and makes it still green at picking time—these are among the conditions that make it particularly susceptible to the development of the scald.

INFLUENCE OF DELAYING THE STORAGE OF THE FRUIT.

The removal of an apple from the tree hastens its ripening. After picking the fruit matures more rapidly than it does when growing on the tree and maturing at the same time. The rapidity of ripening increases as the temperature rises, and the more mature the fruit when picked the less rapidly the maturing processes seem to progress. Fruit that is grown abnormally large seems to ripen relatively faster than medium sized fruit, and different varieties vary widely in the rapidity with which they pass through their normal life history. Therefore, from the theoretical standpoint, any condition in the management of the fruit that causes it to ripen after it is picked shortens its life in the storage house, for it is already so much nearer the end of its life history when stored.

It is probable that a large proportion of all the difficulties with apples in cold storage is due to delaying the storage of the fruit after it is picked. This is especially true in hot weather, and in fruit that comes from sections where the autumn months are usually hot. If the fruit is delayed in piles in the orchard, or in piles or in packages in closed buildings where the ventilation is poor, if transportation is delayed, or the fruit is detained at the terminal point, the ripening progresses rapidly and the fruit may already be near the point of deterioration or may even have commenced to deteriorate from scald or mellowness or decay when the storage house is reached. On the contrary, if the picking season is cool, a delay during a similar period of time might cause no serious injury to the keeping quality.

Delaying the storage of the fruit in warm weather increases its susceptibility to scald. The following table brings out the injury that may be caused by delaying the storage of fruit in hot weather. In this particular case the mean average temperature between September 15-30, 1902, was about 62° F. Fruit picked from the same trees in October and stored two weeks later when the temperature was about 53° F. was not injured by the delay.

SCALD ON IMMEDIATE AND DELAYED STORED APPLES IN FEB., 1903.

Variety.	Picked Sept. 12, 1902; stored Sept 15.	Picked Sept. 15; stored Sept. 30.	Picked Oct. 4; stored Oct 9.	Picked Oct. 5; stored Oct. 19.
	Per cent.	Per cent.	Per cent.	Per cent.
Rhode Island Greening	0	38	(No record)	(No record)
Sutton	0	33	0	0
Tompkins King	0	15	0	0

From the standpoint of the orchardist or apple dealer who cannot secure quick transportation to a distant warehouse, or who cannot obtain refrigerator cars, or who is geographically situated where the weather is usually warm in apple picking time, the local storage plant in which the fruit can be stored at once and distributed in cool weather, offers important advantages.

INFLUENCE OF CULTURAL CONDITIONS.

There seems to be a wide difference in the keeping quality of the same variety when grown under different conditions. It has been observed that the Tompkins King, Hubbardston, and Sutton apples from rapid growing young trees ripen faster than smaller fruit from older, slower growing trees, and therefore reach the end of their life history sooner. From older trees these varieties have kept well until the middle of April, while from young trees the commercial storage limit is sometimes three months shorter.

It has been observed that Rhode Island Greenings, Mann, and Baldwin apples grown on sandy land ripen more rapidly than similar fruit from clay land where all the other conditions of growth were similar.

In the southwest in the younger apple growing sections where the orchards have been planted on new land, the trees grow rapidly and produce an abundance of fruit, but under these conditions the keeping quality of the fruit does not appear to equal that of the same variety from older, slower growing trees.

It does not follow, however, that the longest keeping type of the same variety is the most valuable. An apple that is large and highly colored, brilliant in color, and with commanding style may be worth 50% more—though it will not keep longer than early winter—than the same variety grown under other conditions that causes it to be small and poorly colored and giving it a keeping quality until the spring.

INFLUENCE OF THE TYPE OF PACKAGE.

There has been a good deal of discussion concerning the relative value of closed and ventilated barrels for apple storage. The investigations indicate that the chief advantage of the ventilated package lies in the greater rapidity with which its contents cool off. Apples in a ventilated package, if the ventilation is considerable, are checked in their ripening processes sooner than those in a closed package, and the influence of the package in this respect is most marked with varieties that ripen entirely and in hot weather.

Apples in ventilated packages, however, are likely to shrivel if the fruit is stored for any length of time, and it is, therefore,

not practicable under the present commercial methods of storage to store fruit in packages in which there is much exposure of the fruit to the air.

The smaller the package the quicker the fruit cools off, and therefore the sooner the ripening processes are checked. It has been observed that apples kept longer in bushel boxes than in barrels on this account, and that the fruit can be held much later in the spring in the smaller package as the weight of the fruit itself may cause it to bruise after it begins to mellow.

INFLUENCE OF WRAPPER ON KEEPING QUALITY.

It has been found that a fruit wrapper may influence the keeping quality in several ways. It appears to retard the normal ripening of the fruit and thereby extends its life history. The wrappers are usually useful in extending the season of early winter sorts, or in making the long keeping varieties available beyond the usual period of storage.

The greatest value in the wrapper appears to follow the protection that it gives the apple against bruising and the discoloration that may result from improper packing or rough handling, but especially in preventing the transfer of rot of one apple to another. If the fungus is capable of growing in the storage temperature, it is not likely that the wrapper retards its growth, but it confines the spores when they develop within their wrapper, and their dissemination is difficult or impossible.

The importance of a wrapper in protecting the fruit from decay is brought out by the following table:

AMOUNT OF DECAYED FRUIT APRIL 29, 1903, IN BUSHEL PACKAGES.

Variety.	Newspaper wrapped.	Unwrapped.	Variety.	Newspaper wrapped.	Unwrapped.
	Per cent.	Per cent.		Per cent.	Per cent.
Baker	3.7	27.2	Northern Spy	5.6	52.0
Dickenson	6.4	43.0	Wagener	38.0	63.0
McIntosh	7.7	15.0	Wealthy	42.0	60.0
McIntosh (second lot)	19.7	32.0			

The double wrapper is more efficient in retarding ripening than a single wrapper. A good combination consists of a porous newspaper next to the fruit with an impervious wax or paraffine wrapper on the outside.

From the commercial standpoint it would not be profitable to wrap the common grades of fruit, but for the finest grades, and for the tender varieties like McIntosh, Wealthy, Northern Spy, Belleflower, Jonathan, and Grimes, it is probable that no operation connected with the packing of the fruit would bring greater returns.

BEHAVIOR OF THE FRUIT WHEN REMOVED FROM STORAGE.

There is a general impression that cold storage apples deteriorate quickly after removal from the warehouse. As a matter of fact, however, storage apples do not deteriorate more quickly than other apples that are equally ripe and are held in the same outside temperature. The rapidity with which the fruit deteriorates on removal from storage depends, first, upon the degree of maturity when removed, and second, on the temperature into which it is taken. Late in the spring the fruit is far advanced in its life and the weather is becoming warmer and therefore the apples break down more quickly at that time than early in winter. In commercial practice a large proportion of the fruit is held in storage late in the season for an advance in price, and the owner removes it not because the price has advanced but a longer storage would result in serious deterioration from advanced rots and over-ripeness. When a considerable amount of stock is decayed on removal from the warehouse, the evidence is conclusive the apples should have been sold earlier in the season.

The following table shows the amount of decay on Baldwin apples removed from the same barrel to different temperatures.

AMOUNT OF DECAY AFTER REMOVAL FROM STORAGE TO DIFFERENT TEMPERATURES.

Variety.	Date removed from storage, (1903).	Date inspected.	Per Cent Rot.			
			44° F.	48° F.	61° F.	67° F.
Baldwin	Jan. 29	Jan. 29	0	0	0	0
		Feb. 10	0	0	3	10
		Feb. 13	0	0	12	14
		Feb. 16	0	0	21	24
		Feb. 20	0	4	23	28
		March 3	5	10		
		March 7	5	15		
		March 24	20			
		April 6	36			

THE IMPORTANCE OF GOOD FRUIT.

Apples do not improve in grade in cold storage. In handling a crop too much care can not be given to grading the fruit properly before it enters the storage house. The contents of many packages are injured by the spread of disease from a few imperfect apples. Rots enter the fruit most easily wherever the skin is bruised or broken, and in the early stages of the rot development it is common to see the diseases manifesting themselves around worm holes or bruises occasioned by rough handling, from nails that protrude through the barrels, or from other causes.

When the crop is light it may pay to store apples that are not of the first grade, but such fruit should be rigidly eliminated from the best stock and stored where it can be removed earlier in the season than the better qualities.

The attractiveness and the value of the best fruit is often injured by careless handling. A bruised spot dies and discolors. Finger marks made by pickers, graders, and packers, and injuries from the shifting of the fruit in transit or from rough handling, become more apparent as the season advances. In fact, all of the investigations of the department of agriculture emphasize the fundamental importance of well-grown, carefully handled fruit in successful storage operations.

FRUIT STORAGE.

By John W. Clark, North Hadley, Mass.

Some years ago in growing berries, I found that I wanted something where I could hold them a little to cool them off and I built a little house, a lean-to from my icehouse that would hold —if I call it apples—about thirty bushels of apples. This I run for about four or five years and I found that with berries I did better to get them to market as quick as I could and not put them in it. But if I wanted to ship them I could put them in the house and take the heat out of them and get them cool, put them in there for a few hours, and then I could ship them and they would ship better.

Well, I made up my mind that I wanted a larger house for apples and I looked the matter over and figured on it, and I built a house without ever seeing one before. The house works well and it has proved a good investment and it is a simple, cheap kind of a house.

In order to keep pace with the changes that have taken and are taking place in the handling and marketing of our different fruits the orchardist must change the methods of conducting his business in such a way that he can keep pace with the times and secure the greatest possible returns on the capital and labor invested in his business. To do this he must understand that success does not depend on any one branch of his business, but upon each separate branch being conducted in a careful business-like way. One may have a good orchard, but if the fruit is not well grown and free from imperfections or disease, or if the fruit is well grown but not handled or marketed as it should be, the returns to the grower will be smaller than they might have been, or as it proves in many cases the balance is on the wrong side of the ledger.

The orchardist must not wait until the fruit is ready to be picked before he takes any notice or care of it; he must begin as soon as the buds start their growth in spring to see that the different insects or diseases do not get a hold upon the tree or fruit during its season of growth, that the fruit may go into storage well grown and free from disease or imperfections.

Cold storage does not add anything to the appearance or quality of the fruit. An apple never looks any better than when it is first picked from the tree if properly ripened. Cold storage simply retards the ripening of the fruit and checks the rapid spread of whatever disease it may be affected with. Neither decay or spread of disease will be entirely checked unless the fruit is kept continually frozen, but they will go on more slowly as the temperature approaches the freezing point. One cannot put poor and imperfect fruit in storage and take out good.

Apples as a rule, to give the best results should not be picked before they are fairly well colored. The Baldwin for example, if poorly colored is more apt to scald than when well colored. Different varieties of apples vary in their ability to withstand scald while in cold storage. An apple should not be left on the tree until it is over ripe before being picked or its life will be short even in cold storage. Apples should not be put in heaps upon the ground or kept in a warm place, for they ripen much faster after being picked than before. An apple that begins to ripen before it is put in cold storage will continue to ripen after it is stored but much slower, while an apple that is picked at the proper time and placed at once in cold storage will keep almost indefinitely.

The house that I have was built in 1898. The building is 42 feet by 32 feet with 7 feet posts with 2 x 4-inch studding between. On the outside the house is boarded with Novelty siding; building paper is put between the studding and then boarded with matched pine; this is papered, then 2 x 4-inch studding is put up and then boarded; the 4-inch space made by this boarding is filled with charcoal dust; paper is put on this boarding and 2 x 4-inch studding again put up and again it is boarded. This makes a wall about 16 inches thick with three four-inch spaces, the middle one filled with charcoal dust, the outside and inside spaces dead air spaces. The foundation is of stone with six courses of brick for underpinning.

In the roof above the main part of the building is an ice box 6 x 9 feet running the whole length of the house. The floor beneath the ice is covered with galvanized iron and inclined one inch to carry the water from the melting ice into a gutter from which it is carried by waste pipes to the ground into a tile drain. Extending the whole length of the ice box on each side is an

open space fifteen inches wide connecting the ice box with the main part of the house for the circulation of air between the two. In each end of the ice box are double doors for putting in the ice which is stored in an ice house near the rear end of the cold storage. The ice is drawn up to the ice box by a horse and pulleys. About 200 twenty-inch cakes are used to fill the ice box, which must be filled three or four times to carry the apples through the season.

In the main building at each end are double doors, between these are sliding doors with iron rods three inches apart to keep out intruders when the house is left open at night to cool it down. The floor is of brick with the exception of a concrete driveway nine feet wide and a walk four feet wide to the workroom which is 22 x 14 feet, connected with main store-room by doors.

When ice alone is used to cool the house the temperature will not be lowered much below 40° F. When frosty nights occur the house can be opened and the temperature inside lowered to 32° F., at which the house should be held if possible.

In running my house cold weather has never troubled me. As long as it is cold outside there is little variation as the heat of the earth rising through the brick floor prevents the house getting too cold, while the ice in the ice box regulates the temperature during the warm days that come in winter. Ice should be kept in the ice box as long as the fruit is stored in the house.

Trouble is often experienced from moisture condensing on the fruit and inside of the house. In caring for my house I have experienced little if any trouble to keep the house dry if care is taken not to open the house and admit the outside atmosphere when it is warmer than the temperature inside, for when a warm atmosphere strikes a cold surface its moisture is condensed and deposited on that surface; but this never happens when a cold atmosphere comes in contact with a warmer surface and it has been my practice to open my house cold nights during the fall to help lower the temperature inside and save the ice.

When I left yesterday my house stood about 35, and I can keep it there right along probably until we have cold weather when I can get it down as I want it to about 32 degrees, and I actually think that I can take apples right from my orchard and put them

in there every day as fast as they are picked—pick them and put them in barrels, and putting them in barrels I don't head the barrels, I let the barrels stay open for then the apples are warm—if gradually chill through and will keep steadily cold, and as I said, I really think that by putting my apples in at once every day as they are picked, starting at 40 degrees and keeping them at forty degrees for two or three weeks until you can get the temperature lower, I can keep those apples as long as if they had been out a

John W. Clark's Cold Storage House, Showing Front and Work Room.

week, shipped to Boston and put in those artificial cold storage houses where they put the temperature right down the first day perhaps to 28 and then raise it to 32 and keep it continually at 32—I actually think I can keep my apples in my house as long as they can in that house if those apples have been out a week or ten days. That has been my experience. Now I know one year I had some 600 barrels of A1 Baldwins in a room in a cold storage house in Boston. I went there in the middle of the winter and we went into the house and looked at them and they were just the same as when they were put in, didn't look as you will go in the house after those apples have been in there it will almost seem like an oven until those apples get cooled. After a day or so, the top of the apples are cooled and they will though they had changed at all, really looked greener it seemed to me. I went into another room that was kept just the same

temperature and there were half a dozen men in there picking over apples and those barrels were half of them a mess of rot. They were apples that the dealers had had shipped them, or bought, and finding little or no sale for them in the fall, the markets were so filled with apples, and what to do with them they did not know but thought it would be the better way to put them in cold storage. Well, those apples had begun to ripen and they continued to ripen there. While in one room apples were kept way into the spring. On my lot of 600 barrels, the shrinkage was only half a barrel, apples picked and barreled in the orchard and probably not over four days' time from the tree to the city storehouse, if there was that. So that after apples have

Rear of Mr. Clark's Cold Storage—Filling Ice Box.

begun to ripen they will gradually go on, as Mr. Powell has said, they will gradually go on and ripen in your cold storage.

Now in running this house of mine, I found that I needed ice in it in winter just as much as I did in summer. Now my house is built with a brick floor, except a concrete driveway nine feet wide and a walk to the work-room four feet wide. I built it of brick for this reason. If I put in a floor of wood, or if I put in a solid concrete floor, as I found by some that have done it, the air in the house is liable to wither the fruit if the fruit is open, but with a brick floor there is the moisture gradually coming through that brick into the atmosphere which keeps the fruit

from ripening. Now last year I was bothered for want of barrels. I shipped some 1,600 barrels to Boston and had them stored, then I stored the balance of mine at home, filled my house with bins. The inside of the house is about 29 x 39 feet. It will hold about a thousand barrels. I had this solid, three bins high, and with only one walk, narrow walk, through the house, and those apples were in bins and they kept just as sound, just as plump as when they went in.

Now I find in my experience that the best way I can handle my apples is when they get to a certain stage of ripeness to pick them just as quick as I possibly can get them off the tree. Now if there are no storms the first week or ten days after the fruit is ripe enough to pick it won't drop of itself much of any. After that, if there is any wind, it will begin gradually to drop and as you continue picking for two or three weeks or a month you sometimes will find half of your crop has dropped from your trees. Now an apple that has dropped is not worth over half price in the market what it would have been if it had been picked and properly handled. That none of you will dispute. Now if I can hasten the time of picking a week by putting on all my help but just what I need to run my apples over and barrel the A1s that I have to send in, if I can put all the rest of the help on the picking, why I can hurry up my work very much indeed. Now this year I had about 800 barrels of apples. Well, I got in help enough and had it all cleaned up in three days. It will more than pay the extra that you will have to give for your help. I pay them a little extra. I told them if they would come and stay by me I would give them so much, if they didn't I wouldn't give them but so much—and they all stayed. Every barrel that I can save from dropping I save a dollar on. That I guess any one that has handled good fruit won't dispute; from a picked apple to a dropped apple there is at least a dollar's difference in the price. So that it hastens the time of picking and saves loss from dropping. Then it gives you a chance to hold this poorer or cheaper grade of fruit until they are cleaned up in the market and you can get instead of eight cents a bushel that I got, 25 cents a barrel for apples sent in the fall, $1.80 in the winter—you don't always do that—last year my dropped apples I got about $1.35 when in the fall they wouldn't have been worth,—well, you

couldn't have sold them for cider apples. Then it lets you hold your fruit until the market calls for it, if you store your good fruit, or if you haven't any storage for good fruit you have got to sell it in the fall, for if you haven't storage the sooner you can get your fruit off your hands into money the more money you will have, even if the prices are low, because fruit goes back very fast and there is a great deal of waste and cost in handling it. Now of course the barreling—when you have it in cold storage you can do it in the winter without hiring as much help, when help is more plenty than it is in the fall, and you can very often do it without hiring any at all, any extra help. So that you gain in this way, you save the loss from dropping, you save your cheaper grades of fruit and get something out of them. And I usually intend to have these cheaper grades pay my bills, and my good fruit I have for myself, or try to. So that I have found that running this house has paid me and I really couldn't get along without it and handle my crop as it should be. Because it is hard to get help in the fall.

Mr. ATHERTON: Mr. Clark, I would like to inquire if you have any means of ventilation otherwise than by opening the windows and the doors?

Mr. CLARK: There are no windows in the building. I have a scuttle over the ice box that I can open but I don't open it. I find I can control it full as well without opening that and it seems as if I save ice by not opening it. When it is warm it seems as though the ice near that scuttle goes a great deal faster than it does when it is closed, and as the air comes from the chamber underneath, comes up over the ice and down as it grows colder, this circulation keeps the house, I think, full as cold and a little colder perhaps than as if I had ventilation, had this open; although I open it some and in the fall, frosty nights, and that leads us now you speak of it, perhaps I had better speak of that —I open the door in the main part of the building and also up in the ice box, each end, because when there is a difference in the level of the doors that are open there is a better circulation of air, and I cool the house down better with the same cold outside than I would if I simply opened the lower one and left the upper one closed.

Mr. ATHERTON: Now there is one other question I would like to ask you, what means have you overhead—now a friend

of mine who has what I call an ideal fruit house, in my judgment it is better than artificial cold storage—it is what I call natural cold storage—round the walls about 14 inches he fills with sawdust, overhead he has hay stored, not keeping any stock at all, he has means of ventilation at the side of the barn floor, and I think he has underneath the barn floor, he has sawdust space there, a space constructed so he can put sawdust there but otherwise he has hay there. Now I would like to ask what means you have in your cold storage house overhead to keep the air from above?

Mr. Clark: Why this same wall that goes all about the building, the ice box is boarded the same as the rest of the building; four boardings, three spaces, two of them air spaces, one, the middle one, filled with charcoal dust. But round the ice box the spaces are not quite as thick, one of them I think is not over 1½ in., none of them over 2 in. Around the main part of the house the space is four inches in each, that is, the air chambers and the charcoal. The posts of this building are 7 ft. so that if I store them in barrels I pile three barrels high on end, and store, as I said, about a thousand barrels of apples.

Q. I would like to know if the top barrel keeps as well as the bottom barrel?

Mr. Clark: I have not seen any difference.

Q. The ice probably takes care of that?

Mr. Clark: The ice will probably take care of that. Constant circulation will keep it pretty even.

Q. Why do you pile your barrels one on top of another?

Mr. Clark: I don't put one barrel just over the other. I have them alternate. I don't fill the barrels full enough so that the fruit is above, and you won't hit the fruit, that is, to bruise it. In your lower row there will be one barrel more than in the next row, that is, you lose one barrel, and in that way you can pile your barrels up and leave an open space so that the air from the house can go down into the barrel and the warm air come out.

Q. I would ask about the expense of the building.

Mr. Clark: Of course that will depend on the price of lumber. When I built the house I had the carpenters put the house up, and board it on the outside and make the doors, and we went to work and finished it up ourselves, and this house cost me

about $1,000 in money beside the labor that we put in ourselves. I built it five years ago. Probably if I had hired all the work done and everything it would have cost me about $1,500.

Q. What is the expense in Boston cold storage houses for the season where you have stored your fruit you spoke of?

Mr. CLARK: The expense of putting apples in these large storehouses of course depends on the amount that you put in. Last year it was easy to get storage space. This year I was told in the Quincy Market cold storage house, controlled by a trust now, it is almost impossible to get them to offer you a space in the cold storage house because they are using it for butter and eggs and that class of products which they hold longer and charge them more for the space than for apples. The firm that I have shipped to ever since I began, engaged space last year for 5,000 barrels, they said they were going to; well all of mine went right in that I shipped, some 1,600 barrels. This year they said they began in July to try to engage space and they wouldn't promise them any, and they did get space for a carload for me and I shipped them, then they told me to ship and take the chances, so I billed right to the cold storage house and they wrote me they went in all right, but you took your chances. So it is harder to get space now than it was. There is cold storage in Springfield, Mass., that is twenty miles below where I live. Their price for the season was 40 cents a barrel. In Boston, the price for 5,000 barrels for the season, that is from October to May, after the first of May it is so much a month per barrel, but it is about 35 cents a barrel, that is what it costs. As far as the cost of this storage being an expense to the grower, it is not. Why, just think of it! I put in 1,600 barrels of apples in the cold storage in Boston last year, right from the orchard as they were barreled. When they sent me my check for the apples, the number of barrels of apples was not a single barrel less than what I sent. There wasn't a single apple for shrinkage discounted, while if they had been in ordinary storage there would have been more than 35 cents a barrel waste. Without any decay it would have taken more than that to fill the barrels what they would have shrunk. So that when you come down to the cost of cold storage, if you will figure the shrinkage and waste of your apples in common storage, you have more apples in the spring than you have with your common storage and your stor-

age has not cost you anything, in fact you have made money by putting them in by saving shrinkage even if there is no rise in the price of fruit from fall to spring.

Q. How long did those apples that you speak of remain in cold storage?

Mr. CLARK: There were about 300 barrels of Hubbardstons and Kings and those of course were sold early in the season. The rest were all Baldwins and they didn't sell them till way into March, begin on them, and way into May before they closed them up.

Q. Did you give us to understand that there was no shrinkage on those apples?

Mr. CLARK: Not a single apple did they discount on.

Q. But the apples shrunk?

Mr. CLARK: Not enough to have to fill the barrels.

Q. What we want to know is if cold storage in Boston will hold an apple from picking time up to March without the general shrinkage that it would get in common storage?

Mr. CLARK: It will hold it with a great deal less. Two years before I had 600 barrels in there, they didn't look them over at all, they just took one barrel and when they found a barrel that was a little slack they put in an apple here and there to fill it, and they took one barrel to fill up the 600 barrels so that they were fit for sale. This last year I got them in there sooner and they didn't shrink me a single apple on 1,600 barrels.

Q. Can you tell me where these apples were sold?

Mr. CLARK: Right in the markets of Boston. They were not shipped.

Q. Speaking about the difference between cold storage and common storage, did you put your house in the class of common storage, or the common storage of farmers?

Mr. CLARK: Common storage as farmers.

Mr. GILBERT: In connection with this matter of home storage of fruit, I will ask Mr. F. H. Morse of Waterford to describe to you a fruit house he has constructed on his own premises.

Mr. MORSE: Perhaps I will spend just a minute in telling you why I needed it. In the spring of '86 I bought an old farm, a mile and a half or two miles from my place, well covered with natural fruit apple trees, very thrifty, and all they needed was

grafting and caring for to make them bear. The next spring I grafted and also bought 300 more trees and set those out. Well, very soon I found that I had got to have some place to put the apples. There were old buildings on the farm but of course they would only keep apples for a very short time, and that left me wholly at the mercy of the buyers to sell just as soon as they were picked. Well, I am a little bit of an independent disposition and like to use my judgment instead of being obliged to sell at just such a time, so in the summer of '94 I began to look around to find out what was the best provision I could make to store these apples. I went to Harrison and saw Mr. Dawes' fruit house, but he could keep his only by keeping a fire. I then went to the State Fair, and spoke with all the members of this society whom I could conveniently and whom I knew, and I wished very much to go up to Franklin county to Mr. Whittier's and see his house. I finally went up there with your Secretary and saw Mr. Whittier's. I came back to the State Fair and the first man I met was your president, and he gave me just the hints that I wanted to build the house I contemplated building,—he gave me the general idea, I had to work out the details myself. We had an old stable on the place which we tore down and moved down where we wanted this, and it is built wholly on the cold air—the dead air space principle. As you remember, Mr. Clark's house was built with the middle space filled with charcoal dust, but ours is simply cold air, dead air. We made three dead air spaces, very much the same as he only that instead of using one thickness of board and paper, we used cheap boards and paper between, being very careful indeed to break all the joints so that it would be dead air. I might say here that if any of you do it, you don't want to leave it—I don't care how good a carpenter you get or how good a man you have—you want to oversee that part of it yourself unless you can find better men than I could. They won't realize the necessity of a complete air-tight space enough to do the work as it ought to be.

Ours is built a little different in one other respect than his. The floor, instead of being brick and concrete, as his is, is wood. We were very particular to have the underpinning fit and then we used a mixture of lime and cement to point up with, and that work had to be done very thoroughly indeed so that it would be entirely air-tight, except that we left of course, had to leave two

open windows to let in air or the floor would rot out in a very short time, and also as I have used it since to get ventilation. Overhead ours is simply double-boarded on the flooring with paper between, and then at the same time, whenever we have stored apples we have had a small quantity of hay up there —we use it partly to store hay but mainly for the storage of barrels, but we intend to have a little hay there. We thought we could do that cheaper than we could put in three air spaces as we did on the sides. We used this house, we put in our first apples in 1895. We have used it more or less every year since, and for a cheap building that any one can construct I don't know of anything that equals it. It seems to me from the experience that I have had, that it isn't so much the cold air as it is the even temperature that keeps the apples. Now we put our apples in there, and whoever we have sold to, and whoever has packed them, whether it was in November or February, has without one exception said that they never have seen apples that kept so perfectly as they did in that house. I sold one year when we had a very small crop sixty barrels to a man and he took twenty of them out Thanksgiving time and the rest he wanted I should keep, he thought, till Christmas. Well, they finally stayed there until the 10th of February. They were just three months from the day they were sorted. They kept so well that he didn't sort them at all. They shrunk a little, he filled the barrels and shipped them just as they were without any sorting at all.

Q. About the ice, Mr. Morse, how did you arrange to store ice?

A. I didn't use any ice. I neglected to make that point. Mine is simply a storage house, not cold storage, the cheapest way possible.

Q. I would ask the speaker how much shrinkage there would be?

A. I think they took about two bushels to fill the forty barrels full enough for foreign shipment, if I remember right. That was five or six years ago, but I am sure that was about the amount they used.

Q. You put them in barrels?

A. Yes, sir, usually, but I found three years ago we had nearly 700 barrels that year and the house was only supposed to hold 600 barrels as they are set in, just as they set them in in

barrels, three tiers high. We found when they were about half picked that the house was not going to hold the apples that we had, so instead of putting them in the barrels, we had them set up clear across the back side of the house, then left a space perhaps five feet wide inside, up two tiers with my barrels, and put them over in behind. We did that in two different places so that when we had the house full there were two bins running clear across this building 23 feet, with the apples perhaps five or six feet deep in these bins, and I found when we came to take these apples out—when we commenced to pick it was very warm weather indeed and we picked from 50 to 100 barrels a day—and this brings me to a point I forgot to mention. In building this, it is built simply with a door in the south end. I didn't have any door to drive through—I think Mr. Clark's has a door in each end—but there is a door in the south end and a window in the south corner, and another in the southwest corner, so it makes that corner light enough for packing purposes; but in setting in so many of those apples in the barrels and picked in such warm weather, I found they were very slow in cooling off. When we came to take them out the apples that were put in first, they showed the effect of the warmth a great deal more than those that were picked later, so last year and this I have used a large bin running clear across the building with the boards put apart an inch or so, so as to give a chance, and also build up from the floor a little, so as to give a circulation of air in there around this bin. And I cut a hole through the floor back of it, so I got a draft of air through the floor back of the bin and so through the apples, and in that way it cools them off more readily. And if I were to build another—as soon as I can get to it I intend to do it—a year ago this summer if my health hadn't failed me I should have bought this round tiling about a foot in diameter and laid two rows of that off through the ground perhaps thirty feet, and had that come up on the back side of the building so as to get a cool draft of air to come up from the ground to a depth that would have cooled the air as it came in. I have a stairway that goes up into the upstairs from the main part of the building, which I can push up or down according as I want it, close it up or not. So when I want to open it, with that open, and the ventilator up chamber, and this ventilation that I intend to put in—I have now a hole cut in the floor which makes some—I

think I can cool them in the back part of the building as readily as in the front. The winters I have kept them in there, I have been in there several times and the thermometer would not vary somtimes a degree in a month or two. I almost thought while Mr. Clark was talking yesterday I could hold them more evenly than he did with his ice, but I suppose I am a little egotistical on that point. But certainly for anything that is so cheap, and anything that any one of you can do—now if a man has any space, any barn room, one part of his barn that he can spare, by fixing it up with these air spaces it is just as good as to build a separate building. You see I am at a disadvantage. This building is a mile and a half away from my home. If it was right at home I could go out in the evening and open all the ventilators and let in the cold air and I think I could have it down way below forty —it was almost down to 40 Monday. Mr. Clark told you that home storage house down to forty was as good as cold storage I believe at 32 in his case. I have been there a few times during these cold snaps and opened it, and have gone up when it grew warmer and shut it up, and in that way I think it was down to 42 or 43 when I was up there last. Of course this warm weather it may work up a little but it is so gradual the apples don't change as they would in an open building.

Mr. GILBERT: Have you held your apples through any considerable, prolonged seasons of low temperature?

A. The year that we had those 40 barrels that I spoke of in there, he said he would like to leave them there, as I said, until about Christmas, and I simply shut the house up very carelessly and didn't put on any battens as I should have if I had supposed they were going to stay till February. About ten days before he took them the thermometer went down to 25 below zero, and those apples they had chilled the least bit, but not so but what they barreled them up as they were. It was an old buyer that bought them. Of course they couldn't have been very badly chilled or he wouldn't have shipped them without thawing out. If I had known they were to stay there I could have had it warm enough. There is not the least trouble to keep them from freezing if you attend to it properly. I don't worry a mite about that, I shouldn't about keeping them from now to next April if I thought it was the proper thing to do as far as the market goes.

Mr. Powell: I take a great deal of interest in this home storage question and I want to make just one suggestion. The State of Illinois appropriated about $10,000 two years ago to take up the question of fruit storage among other things. They have been paying special attention to the construction of these farm storage houses and the University of Illinois constructed a farm storage plant on the lines that they thought

STORAGE HOUSE OF CHAS. L. GREEN, EAST WILTON.

Mr. Green kindly furnishes the photograph and sends the, following description of his storage house built in 1903.

In reply will say the building is 30x40 feet with 12 foot posts. We dug the cellar out of a steep, hard gravel bank with end to the south. This permits the team to back the apples into cellar without unloading. The walks of the cellar are built of quarried granite laid solid in cement.

The underpinning is of granite pinners laid in Portland cement and lined with brick. This gives me a cellar three barrels high and will hold 1,000 barrels or that amount in bulk. I store them the latter way.

The building is sheathed on outside with matched hemlock. thick sheathing paper outside of that then clapboards and paint. The inside is sheathed 8 feet high also overhead. We then set another course of studding clear round and sheathed again. This gives two dead air spaces and three matched sheathings besides paper. clapboards and paint. The floor between this room and cellar is double with hemlock for under course and matched beech on top and heavy paper between. This room as well as cellar has double doors and windows with matched board blinds inside of windows. This room will hold 1,050 barrels with some room to spare. The attic has room for perhaps 1,200 empty barrels. This makes a very handy arrangement for an apple store house. The cost of this building is about $1,200.

would be advisable for farmers to construct them for that country. The suggestion I want to make is this, that in case any one desires to do it, you write to the University of Illinois at Urbana, and ask them for their bulletin describing the cold storage house. They will send you that bulletin without any charge. It gives all the plans, specifications and drawings, with cost of lumber and other things, in the construction of this house. There are several things in that house different from any other house that I have seen. They were able to hold it for eight months in succession at a temperature of 33 to 34 degrees.

FRUIT PACKAGES.

By D. H. Knowlton.

One of the important questions which arise in connection with our great fruit crop, not only this year but in years to come, is—What shall we pack the apples in? A few years ago when any one said anything about boxes he was almost hooted, because nearly every one said the ideal package for apples was the barrel. I have always believed in the box or basket or anything else for a package that would enable us to sell our fruit. A great many times I am asked what is the best package, and I almost invariably tell people, any package that will enable you to sell your fruit to the best advantage. A gentleman at Farmington who is interested in growing fruit has asked me repeatedly, "Why don't your society determine what is the best size for a box?" Well, now, I don't know what it is. I don't think anybody does. Perhaps we may never find out. But this is true and is going to be verified in the years to come, that the man who packs his apples in a box or basket, or anything else, that people like and fancy, his apples are going to sell. And that is just the secret of this whole thing. You cannot make a law that will determine it or anything of the kind.

The difficulty of obtaining barrels this year seems to be the turning point with many and we find many are now favoring the box. There has been a great change in sentiment and the question comes, What kind of a box? Well, there are several kinds of boxes being used. Some like one kind, some like another.

No one yet knows which the best kind is. There are several kinds in the hall. The box which I now show you is one to which considerable interest attaches. You see upon the box there what it contained when it came into our possession. It was a box of Oregon Spitzenburg.

Now as to how these apples were put up, you see these pieces of blue cardboard in my hand. In the bottom of the box was one of these pieces of blue cardboard. Each apple was wrapped in white paper. There were four rows as I remember it of apples in each layer. Then after the first layer was in, another piece of blue cardboard went in, and so on through the box, and at the top went one of these sheets of cardboard laid over the whole. That was the shape we got that box in, and that is the Oregon style of apple box, and I think it is about the same size as most of the apple boxes from the Pacific states that are found in our Eastern markets.

In the back part of the hall are several boxes to which I wish to call attention. There are several boxes there from the Wells, Higman Company of St. Joseph, Michigan. We found quite a lot of those things in Boston at the meeting of the American Pomological Society, and I thought it was an entirely proper thing for the fruit growers of Maine to have an opportunity of examining them. The largest Michigan box manufactured by this concern is the one with the small red apples in. It contains a bushel. I won't trouble to give the dimensions of these boxes because you can see them there for yourselves. Those sell according to the price list which I have in my hand at $10 per hundred there. It is a hardwood box. There is another box there in which the Northern Spies are packed. That also is a bushel box. The price of that box is $7 per 100 on the cars, where they are manufactured. There are also some smaller boxes. One of them is a half bushel box. I don't recall exactly what the price is. Mr. Nowell in Boston called my attention especially to some baskets that came from this same concern that were on exhibition there, and so when I sent my letter to them I requested them to send me also some of those baskets. The bushel baskets are popular for the selling of peaches and they are also using them very largely in Michigan this year for the marketing of apples. A letter under date of October 22 from these manufacturers says: "Barrels are worth forty cents each here and there are not

enough to supply the demand. Have you ever tried bushel baskets with slat covers for shipping apples? A great many are using them in this section. We can furnish you bushel baskets with covers delivered to Boston in car lots at $1.50 per dozen." In another letter they say: "Nearly all of our large peach crop and a good share of the apple crop in Michigan has been marketed in bushel baskets. This package seems to be growing in favor with the shipper everywhere."

In connection with the berry and fruit packages which are exhibited on the table—and I wish everyone interested in the matter of small fruits would give them careful examination—are a lot of berry baskets manufactured from paper, lined with paraffine. It seems to me that they are about as nearly an ideal package as anything that we can have for small fruits.

There is also another exhibit—I speak of it now because I may not think of it again—the paring machines, apple knives and various articles, tools, etc., connected with the use of apples, from the Goodale Company. They have sent a good lot of circulars and I wish every lady would take one of the circulars "Turning apples into gold." There are interesting and perhaps valuable recipes in connection with manufacturing apples in various ways for domestic use.

A recent newspaper item says: "A New Jersey fruit grower, Mr. Samuel A. Miller, packs his apples in bushel boxes lined with corrugated paper, and tissue inside of that. The apples are polished to bring out the beauty of the coloring and then placed in regular rows, three layers deep, 84 apples to the box." These apples command a fancy price only on account of the care used in packing, and the market for such fruit has never been glutted.

J. H. Hale who has several times been with us in Maine, is one of the most successful peach growers in the United States, and has devoted a great deal of attention to growing and packing for long shipments. At the Pomological Convention in Boston, he declared that fruit well matured on the tree, if rightly handled, will keep better, look better, and sell better than fruit packed half ripe. Mr. Hale also stated that fruit packed in paper wrappings sells from 10 to 25 per cent higher than the market price.

Until quite recently every commission man in New England would tell you emphatically that you must not send apples to him in boxes. But this year a change has been coming about, as you

will see by the communications which I am going to read to you. Mr. A. W. Otis, in a recent interview, said he had been adverse to the use of boxes because of the cost of handling the box, costing more to truck, etc., but if the box is to be used—you see he gives in a little—if the box is to be used he favored a half barrel box. And that gives me an opportunity of referring to the box of fruit exhibited by Mr. Phinney, which contains just a half barrel of apples. It also contains, this particular box, wrapped apples, which shows the style in which he is marketing his fruit, and I have no doubt he will realize a good price for it.

A. & O. W. Mead & Company, who have handled this year quite a large quantity of Maine apples, write me as follows:

"In regard to packing apples in boxes, would say that it has been our experience that the fruit does not bring as much when packed in boxes as it does in barrels. The trade is not accustomed to buying in boxes, and will not buy them unless at a reduced figure.

"We know that for the last few years barrels have been pretty scarce and consequently very high, and the question of package is very important to the farmer. It seems to us that in sections where there are a good many apples farmers could easily supply themselves with barrels at a co-operative factory in their section. Each farmer would know how many barrels he would need, and they could be made up ahead so that no one would be without barrels in the packing season. It seems to us that this is the most practical way out of the difficulty."

One embarrassment which is existing the present season in regard to barrels is that somehow or other, I don't know why, the buyers seem to have all the barrels.

York & Whitney, another firm who have sold a good many Maine apples, writes me as follows—this particular letter was written by Mr. York:

"I realize that your association is of great importance to the public in general. The product that interests me the most at the present time is the apple, which I consider the most important of all fruits, as demand is increasing each year, not only in our own country but for exporting, and every year the packages seem to be a more and more difficult problem. Many of the growers of fruit at this season of the year, find themselves with-

out packages to ship in or with half enough, thus causing the fruit to lay around for want of proper packages, and get more or less over-ripe and in many cases arriving in the market in poor condition and thus causing poor results. I feel after a long experience in the business in gathering, packing and selling the fruit, that there should be some action taken by the growers whereby they can provide themselves with suitable packages for marketing their fruit before it lays around and gets sweaty and over-ripe. I feel that there is no package better than a good full sized barrel that will hold three bushels, and it seems as if the growers in different sections could band together, and start barrel manufactories so as to provide themselves with packages suitable to ship in. The question of using boxes has been more or less discussed for the last few years. While I do not wish to say that this is not practical, I feel that it will take a long time to get people accustomed to buying fruit in such packages. Also the transportation companies would have to arrange different rates probably. If the growers should decide to make a change and ship some of their fruit in boxes, I would suggest boxes that would hold a bushel and a half, to be made solid and closed up tight for winter use. In marketing the fruit would suggest that they mark it on the end of the box, the variety, the quality, and shipper's name. Always bear in mind and keep the quality A1.

"I feel that Maine has one of the best prospects for the culture of apples, of any of our states as their fruit is growing more and more in favor in Europe each year, and they being right on the seaboard, can market their fruit as cheap, or cheaper, than most any other state."

I crossed over the street from York & Whitney's to examine a pile of boxes which I found contained apples from Maine. They were the ordinary 50 lb. evaporated apple box. Mr. Lawrence of Lawrence & Company told me the people down in Maine kept writing him to know what to do with their apples—they could not get barrels. He replied, telling them to pack in these boxes if they could get them. A car load of them came in. His neighbors laughed at him. But he examined the apples and found they were good, and he put a label upon them which he thought would be all right, and the apples began to disappear. He found he could sell them for a little better price than he had been selling the barrels. Not long after this some of his neigh-

bors came to him and wanted to know how it was he was able to make larger returns to the growers than they were. "Do you see those boxes?" he replied, "There is the secret. People won't buy a barrel of apples but they are glad to get a box. I used to buy a barrel of flour at a time, but now I buy a bag instead. Wife likes it better and so do I." He has kindly sent me the following letter:

"In answer to your inquiry of the 3d inst. would say that till this season we did not favor the box for apples, but owing to the high price of barrels we did advise boxes and the results have proved very satisfactory to both shipper and ourselves, and advise the box with the following dimensions: 18 inches square, 8 inches deep, inside measurement. A box of this size can be utilized for other purposes.

"We have received several thousand boxes this season and we find they meet the requirements of this market, especially to those supplying the family trade, where a barrel is in many cases too large a quantity. To command high price only best stock should be used, and utmost care used in packing."

There are, in my opinion, even more desirable packages for the dessert apple. Not long since when in Boston, I saw some fine Somerset apples. They sold for three cents each, and I was exceedingly glad to get one for I wanted a Maine apple. I am quite sure a man rushing for the train would be glad to pick up a small basket of these for his wife, when he would not think of buying a bushel or even a half a barrel, and as for putting them up in a paper bag he would not think of waiting for that. And I believe earnestly and sincerely that one thing we want to work for all it is worth, in the State of Maine, in Massachusetts and everywhere else Maine apples go in the United States, is to put our fruit up in such way that the local dealer, that people who eat apples in Maine cities and Massachusetts cities and elsewhere, will feel that they want some as quick as they see them, and will take them home any way because they are in packages in which they can carry them conveniently.

Mr. Pope: I notice that the firm of Manchester & Son, orchardists, in Bristol, Connecticut, are selling all their fruit this year in these baskets (showing one). This only holds a half a bushel, costs 5¼ cents, cheaper than the box, has a bail to it—a man comes along in the market and he finds a handsome apple

that can be bought with the package that he can catch on his arm—you see the inducement there is to take it home with him. That one (indicating basket) will hold just about half a bushel. The cover fastens on. He wrote that he was selling his apples at a much higher price in that way than in the barrel.

ORCHARD FERTILITY.

RESULTS FROM USE OF CHEMICAL FERTILIZERS.

S. H. Dawes, Grand View Farm, Harrison: I do not claim to be an expert in the use of chemicals, nor any authority whatever on the subject, neither am I introducing anything new.

The formula that I have been using, I am told, was originated by Dr. Fisher, a noted fruit grower of Fitchburg, Mass. All that I know or can say of him is, that if all of his prescriptions prove as successful as this one, he must be a good doctor, and all I can do is to give you the benefit of my short experience with his formula for the last two seasons.

I have always been skeptical in regard to the use of commercial fertilizers especially the different brands of phosphates, such as our farmers and fruit growers have been in the habit of using. I do not believe that on the average they get their money back. It is of no benefit whatever to the farmer or fruit grower to use any kind of a fertilizer just because it will make things grow, if it does not leave a good margin of profit over and above all that it costs; and I am the last man to use them myself or recommend them to others. If I should hear anyone else make the statements that I am about to make I should call him a lunatic; and it won't hurt my feelings if you call me one, as long as I know that they are facts, and I have the fruit.

My attention was first called to their use by one of my neighbors, who used them around his trees, and took me into his orchard to see its effects. I noticed that the grass made a luxuriant growth around the trees, but I thought to myself that the grass would get all the benefit there was in it, and that it would not do the tree or fruit much if any good. Later on I took another look at them and was somewhat surprised to see that the trees had changed their foliage from a light sickly color to a dark green

and had a healthy, thrifty look; but I could not discover much difference in the fruit as it was too early in the season for that, and I went away about as skeptical as ever. I did not see them again that season, but after he had gathered his fruit he brought me some samples to look at, and I must say that I was completely surprised. I had always known the farm, but there were never such specimens raised there before, and I never saw their equal anywhere. As I did not exactly fancy having my neighbor grow larger and better fruit than I could, it induced me, the following spring of 1902, to try the chemicals in a small way, and I purchased 500 lbs. at a cost of about ten dollars, mixing them according to the formula.

Following is the fruit fertilizer formula:

Nitrate of Soda,	350 lbs.
Sulph. of Ammonia,	150 lbs.
Sulph. of Potash,	230 lbs.
Acid Phosphate,	220 lbs.
Keiseret,	50 lbs.

All to be thoroughly mixed and sown on the surface under the tree, out a little further than the limbs extend, at the rate of ten lbs. to a medium sized tree, from the first until the tenth of May, or as soon as the blossom buds begin to open.

I shoveled this mixture into a cart and drove through the orchard and applied ten pounds to the tree, to about all the different kinds of fruit, selecting only those going to blossom, and only one or two of a kind, to see what the effect would be in the different sorts. But somehow or other I could not help feeling that a fool and his money had soon parted, for I was loath to believe that it would amount to anything to sow just ten pounds, a little less than four quarts, on the grass ground that was seeded down nine years ago, without its being hoed or raked in. One could scarcely see it after it was applied. But the results were marvelous. I do know and can prove that I got extra fruit enough from two trees—a McIntosh Red and a Fallawater—to more than pay the whole expense of the chemicals.

I was so well pleased with the results that I purchased two tons the present year and applied in same manner, with the exception that I made the application to lots of trees, that had no blossoms and of course I received no benefit from those the present season. But I wished to see what the effect would be

the next year and if it would cause the tree to set more fruit buds, to blossom and bear fruit the following season.

In order to satisfy myself and others more fully in regard to the real merits of this fertilizer I tried the following experiment: On the east end of my main orchard I have a block of just one hundred Baldwin trees, five rows, twenty trees in each row, and the conditions as to size and soil are as nearly equal as it is possible to have them.

On the middle row I made no application whatever, but applied it, at the rate of ten pounds to the tree, to all the rest of the block, with the following result. On the row where there were none of the chemicals used I picked just twenty-one barrels, including all the windfalls. The average yield to the other four rows was just forty-eight barrels to each row, including the windfalls, making an aggregate of one hundred and eight barrels extra, just as they were picked, that I got on the four rows where the chemicals were used.

Their value could not be less than seventy-five cents per barrel as there were but few culls among them, which amounts to eighty-one dollars. The cost of the formula, including two pounds extra that I applied to one row, was not over eighteen dollars, which deducted from eighty-one dollars leaves a net profit of sixty-three dollars on the four rows, more than I should have had if none of the chemicals had been used. It must be borne in mind that the results would have been far more satisfactory, if the trees had all blossomed. A good many had only a very few and quite a number none at all, consequently there was no benefit derived from those although they were all treated alike. The fruit on the treated trees was much larger and superior in every respect, with the exception of the color, which was not quite as good, with less No. 2 fruit and culls.

The results were equally satisfactory on all the rest of the orchard where it was applied. Especially so with the Bellflowers, where I applied it to trees that never bore anything but culls I had the largest and finest specimens I ever raised. I also applied it to my pear trees with like good results, as a proof of which I shall refer you to my fruit on the exhibition table for further evidence. I also derived another benefit from its use that I consider worth mentioning. I certainly cut not less than one ton of good hay more than I should have had in the orchard if the chemicals

had not been used, and if the results prove in the future as they have in the past, I shall feel that the problem is solved that you can grow hay and fruit to good advantage in the same orchard, and you can enjoy more religion in sorting up the fruit. Why it was just fun to sort those big fellows into the barrels.

Mr. Archibald, the man who bought my fruit, said that during his four years' experience in buying and packing apples, he had never sorted up Baldwins that averaged as large as mine did this season, where I used the chemicals.

What the results will be in the future, in different soils and changed conditions, or what the effect will be on the trees, I will not venture to predict. The seasons have a great influence on almost everything that grows. The two past ones will go into history as the coldest and most freaky of any that we have known. Noted for their average low temperatures, the failure of the corn crop, little pumpkins, big potatoes, with a tremendous fruit crop for the odd year.

These may have had an influence one way or another, in the use of chemicals. But I do know that they have done all for me that I claim, and my faith in them is so strong that I shall use more of them next season than ever, and would recommend to all those interested in fruit growing, to try them in a small way at first and study the results.

Mr. GILBERT: While the author of the paper is unable to respond to any questions it may not be out of place to say that we have here present with us "the other fellow" who was likely to or had been beating Mr. Dawes and by whom Mr. Dawes himself did not like to be "downed" and as a matter of endorsement of what he has given to you I will call upon Mr. Breed.

Mr. W. O. BREED: I came into the State of Maine two years ago last spring and bought a farm that was a tough proposition, I assure you, especially the orchard end of it. The farm had been running down for years. The apple crop—well, I got the first season that I was there, 75 barrels off from about 1400 trees, and you can imagine how much of a crop it was compared with what it ought to have been. The orchard was a rugged, rocky pasture. The former owner said there were 300,000 feet of first class pine on the farm. The logging pines on the farm were all inside of a half acre, but I concluded I got my 300,000 feet of pine in lineal feet instead of board measure because the orchard

was full of pine. I went to work and cleared off the pine. To go back, I wrote to three different parties, the Experiment Station at Orono, the Agricultural College at Amherst, Mass., and to Dr. Fisher whom I knew of as being one of the horticultural lights of Massachusetts, stated the case, told them that I hadn't any fertilizer to start this orchard up and asked for their advice. All three parties sent me formulas. I studied them over and came to the conclusion that Dr. Fisher was as near right as any one of them, if not more so. I took his formula and went to work. When my friend, Mr. Dawes, asked me what I was going to do, I told him. "Now," he says, "young man, go slow." He says "I have used lots of commercial fertilizer on my orchard," or "I have used commercial fertilizer and I never got a new dollar for an old one." When I told him I was going to use $150 worth, he said "Don't do it, your money is gone." I had faith in the stuff and I put it in. Mr. Dawes came over and as he says, he was surprised at the results, and I was surprised, and when he came round the following winter and says, "Well, Breed, if you have got anything there that you are willing to give away, or willing to let me know," I thought I had captured one good convert. The result as he has outlined it with him is everything that he has stated. But here is one point that I wish to raise in connection with that middle row of Baldwins which he did not fertilize. His trees are only 24½ feet apart and those roots of course are interlocking roots. The roots from the unfertilized row went over into the other row, couldn't help it. They got some fertilizer from the next row, and I claim that that middle row from which he got the 21 barrels was several barrels ahead of what it would have been if nothing had been put on either row. And the consequence is that the showing, if you get right down to facts, would be even greater than he shows. But it is not my purpose to take up your time. I will say however that I trust that every one won't go into this business. If you do barrels will be worth a dollar and a half apiece and the filled barrels will be worth about fifty cents. I don't think there will be much money in it.

Mr. GILBERT: Will you please to state how many barrels of apples you have picked the present year from that run down orchard?

Section of S. H. Dawes' Pear Orchard, Harrison.

Mr. BREED: You touch my modesty, Mr. President. Up to the present year my friend Dawes tells me—and he knows the farm, we touch elbows over the back fence, our farms join at the rear—he tells me that 600 barrels has been the maximum crop. This year my crop is almost 1400. But I will say right here that since the first year that I was on the farm, with the exception of making slight applications of nitrate of soda I have not used any chemicals on my apple orchard. I fenced off a small portion of one of the orchards, or the main orchard, and put pigs in there the first year that I was there. The result was so pleasing to me that last year I took in the whole orchard or about 14 acres and fenced it and turned in about thirty, large and small, swine. They went to work and worked it over. I didn't feed them at all after the middle of May until I took them out of the orchard just before picking the fruit. The consequence was they didn't grow as swine would that had been fed but I got some work out of them. I told them it was "root, hog, or die" and they took the easiest part of it which was to root. I put them in there the same this year, and at the present time of the whole fourteen acres there isn't a half acre but what has been completely turned over by the pigs.

Q. Haven't they done as much as the phosphate in your judgment?

A. I will say this that in my judgment the fruit is not so large this year as it would have been if I had used chemicals, for this reason: The first year that I was there I used the chemicals and I had some of the finest and largest Baldwin apples that I ever saw. I cannot say it of this year. But what has been lost in size and all that has been more than made up in number. I have got a big crop but I really don't think that the apples are so large on the average, in fact I know they have not been so large as they were the first year I was there, those trees around which I placed the chemicals.

Mr. GILBERT: We have another fruit grower with us who has been after the same object but approached it from a slightly different tangent. I will call upon Mr. Phinney of Standish who has been successful in renovating an old orchard and in growing a new one, and in obtaining fruit from both.

C. S. PHINNEY: Some time ago the secretary of this society approached me and asked me if I would prepare a paper on the

use of chemicals in the orchard. I told him I didn't think I could prepare anything that could be dignified by the name of a paper or address, but if the subject was opened up here that I would be glad to help along with a few words in the discussion.

Now my vocation is that of a commercial traveler and I have been following that business for eighteen years, and I have acquired the habit of being very bashful, so that it is embarrassing for me to appear here before such a large crowd. I could take one man I think out in some corner or in some secluded place and I could either paralyze him or I could sell him a bill of goods, but it is very embarrassing to speak here. However, I will give you as briefly as I can my experience on chemicals in an orchard.

I want to say first that I was brought up on a farm and I have always had an interest in fruit growing and always liked it and always thought I would like to have an orchard. So in 1891, when I had an opportunity to buy a comparatively small orchard, about 150 trees with 16 acres of land, I purchased the land and the orchard. Being away from home all the time as I am, I keep no stock. The field was in a run out condition and if I did anything with it I had got to do it with commercial fertilizer. I commenced first by plowing up this orchard, and I want to say that this was an orchard that had been set out perhaps thirty years, twenty-five to thirty years, and had never yielded what might be called a fair crop. I plowed it in the spring of 1891 and applied commercial fertilizer at the rate of about fifteen hundred pounds to the acre and planted it to potatoes. The next year I sold $400 worth of apples off that orchard. I thought that was a success and that I would try some more trees. I bought and set out 300, using commercial fertilizer in the holes where they were set, perhaps a quart or a quart and a half to a tree, and where I set these young trees I plowed a narrow strip perhaps 6 to 8 feet wide up and down the row, and I have kept them cultivated from that time to this and have applied each year a moderate amount of commercial fertilizer. On the larger trees I have applied about 400 or 500 pounds, since the first application of 1500 pounds I have applied about 400 or 500 pounds to the acre sowed broadcast and harrowed in. The result has been that that orchard has been very profitable. Since 1892 when I got my first crop I have failed but one year to get a good fair

crop of apples. That year the trees bloomed well but we had a cold, drenching rain when they were in full bloom and I didn't harvest a peck of apples. With that exception, as I say, I have had a good fair crop each year and they have been all good quality, kept well and sold well in the market. The younger trees I have just harvested—about 100 Ben Davis that were set out 8 years ago,—100 barrels of very nice Ben Davis apples. And my Spies—I picked 99 barrels of Spies from 11 trees this year. The Spies were not large but they were of good quality. I want to say that these trees, the orchard of bearing trees and the small trees, have all been cultivated all this time, it has been under tillage—not always plowed every year, but harrowed if not plowed. The grass has been kept down or plowed under, and while I believe that a moderate application of fertilizer will pay, in fact I know it has paid me wonderfully well, I want to say that I believe as much or more in tillage as I do in the fertilization. I believe on a great many of our farms that if you would till the land and do nothing else that you would meet with very good success. Of course we know that on most farms the supply of stable manure is limited,—while it may be as good or even better than the commercial fertilizer for the trees, the amount of it is limited, and if we are going into growing apples extensively, if a man is going to have fifteen or twenty acres of orchard, or thirty or forty, he would hardly have the stable manure to spare, and there is no limit to the amount of fertilizer he can obtain, if he can use it with a profit. If he can't use it with a profit, of course he don't want to use it at all, as Brother Dawes says. I believe that many of these old farms could be set out to fruit orchards and cultivated and fertilized with commercial fertilizer, and I want to say right here that you don't want to buy your fertilizer at haphazard. You want the right kind, you want the right formula. The fertilizer that I use contains 3 to 4% of ammonia; 7 to 9% soluble and available phosphoric acid; 13 to 15% total phosphoric acid, equal to 28 to 32% bone phosphate; 10 to 12% potash (K_2O), equal to 18 to 22% muriate of potash.

Q. I would ask the gentleman if he does any spraying?

A. Yes, sir, I do, I have sprayed ever since I have owned an orchard. I spray just as the buds are about ready to open up.

Q. What time do you do your second spraying?

A. After the petals have all fallen, while it sticks out on the stem, before it gets heavy enough to bend it. If I understand it correctly the first brood of coddling moths commence their operations in the blossom end of the apple, and you want to spray while that is exposed so that your spray will take that in. Spray again the third time when the apple is perhaps as large as a small walnut, or a pigeon's egg, something like that, according to the season. Now in this connection there is something I want to say. Last year I was situated so I could not spray my orchard at the proper time. When I picked my apples in the fall they looked as fair and nice as could be, but in the course of five or six weeks after they were put in the cellar there wasn't more than a third of them that were really fit to go into the market they were spotted so badly. This year my apples have shown no indication of a spot yet. They were sprayed this summer. Still further, I had an opportunity to buy a few apples in a little orchard near me—the party was not living on the place and he wanted to sell them and I bought them on the tree and put them into my cellar. I am packing now a carload of apples to ship away and I packed those up first and out of sixteen barrels I picked from that orchard I don't believe there are three barrels fit to sell. They were all spotted—my apples in the same cellar are not spotted.

Q. Do you mean the scab or the black spot?

A. A little spot that looks as if the apple had the small pox, but I imagine it will develop into that fungus later on, but the apple is spoiled for the market.

Q. May I ask what you use to spray with?

A. Formerly I used the Bordeaux mixture as recommended by our Experiment Station. I am using now a prepared form of Bordeaux mixture which is both an insecticide and a fungicide. The insecticide is in the form of arsenate of lead which is superior for fruit trees I think to Paris green, in that it won't burn the foliage and it will stick on. The trees I sprayed last spring there was sufficient poison on the leaves to kill the web moth, fall web worm. When they hatch out in August or the first of September, they will hatch out on the tip of the limb and spin their web back on the limb until they get to the old leaves, and they will very soon drop off. I have no trouble at all with caterpillars or web worms or any insects of that kind in the trees. I don't think a man would make very big wages hunting for wormy

apples in my orchard at five cents apiece, not on trees that are thoroughly sprayed.

Mr. GILBERT: Or any other orchard this year?

A. Well, no, I have seen wormy apples this year. I can take you right into my orchard on some trees that were not sprayed and show you lots of wormy apples. They are very free from worms as a rule, that is true.

Mr. BREED: Mr. President, I see that the speaker is in rather an embarrassing situation and some of us are not getting what information we would like to have. I see he is very chary about giving us that information. He does not tell us the name of this preparation.

Mr. PHINNEY: I hoped, Mr. Breed, that that question would not be asked. I did not come here to talk shop—for spraying I use Pyrox that is manufactured by the Bowker Chemical Company. It may be a little more expensive than the home made but it is more convenient.

Prof. MAYNARD: I would like to ask the speaker how much fertilizer he uses per acre. He has given us the formula but not the amount.

Mr. PHINNEY: The first application I made on this orchard was about 1500 pounds to the acre. I am using now not over 500 pounds to the acre and that seems to force the trees all that is necessary with the tillage that is given them. I have here a picture of a tree from which I took 13 barrels of Spies this year. If you could visit my orchard today—all the leaves are on that tree now and I think it is admitted that is an indication of vigor in a tree, and further than that I think it would show that it has made a reasonable growth notwithstanding this great load of fruit. I don't believe you want to use too much fertilizer and drive the trees too hard.

RESULTS FROM THE USE OF BARN MANURES.

Mr. GILBERT: For fear that we might leave the impression that there was no further use for barn manure, or that barn manures were not good for orchard culture, we introduce one of our associates who has had some experience with barn manures in making orchards bear.

V. P. DECOSTER: I feel very much this afternoon as the man did that was called to the sick bed of his wife. She said "Before

I die I want you to make me a promise and that is that you will ride with my mother to my grave." "Well, wife, I will make the promise but it takes all the pleasure from the ride." Now that is just the case with me this afternoon, it has taken all the pleasure from this meeting, being called upon at this time.

Mr. Phinney says to us that he is a travelling man. He buys his fertilizers and says "Boys, go and do so and so." Now I say to you "I am a farmer." What has been done to my trees, I have had to take my coat off, roll up my sleeves and take the shovel, and say "Come, boys, let's fertilize those trees." I suppose that I am put upon this question of barn dressing to represent the poor man, the man that does not have the means that Mr. Dawes and Mr. Phinney have to purchase commercial fertilizers. But I assure you, gentlemen, I am a thorough believer in barn dressing for my trees. Now I have taken my trees from the seeds. I haven't twenty-five trees on my farm of nearly 500 trees but what I have grown from the seed. Why, those trees are almost like one of the family. I have trimmed them, pruned them, cared for them until today they are capable of raising eight or nine barrels of fruit to a tree; and that has been due to barn dressing. You may talk about your commercial fertilizers—I have used them and believe in them in a measure—but I do believe the farmers of this State cannot rely wholly upon commercial fertilizers for their fruit trees. My trees, as I said before, I raised from the seed. I gave them the first initiation, the first degree upon barn dressing. I dug a good trench and threw my seed upon that dressing, had barn dressing. The next year they came up. Why how I watched those seeds as they came through the ground. I want to say right here there is not a young man in this house today but what should start his own trees. You can't realize the pleasure and the satisfaction it is to you to watch those trees. It makes you love the old farm, you hate to go away and leave the children you are bringing up. You can't imagine the pleasure and satisfaction it is to have something to watch and care for,—and something that will keep the boys home upon the farm,—I don't care if they are girls too. As those trees grew, I grafted some of them in the nursery, some I splice grafted, some I budded, others I set out as seedlings. And I will say right here I prefer the seedling tree. I find I get fruit just as quickly as those grafted in the nursery close to the

ground, and I prefer them for many reasons. I lost a lot of my scions by their growing so rapidly they winter-killed. But I must not touch upon that point. I could not help it. It came into my mind. After those trees became large enough to set out, I kept that field plowed. I used to put on an application of dressing, 10 to 20 loads to the acre, as the case may be, and I not only grew my trees but my crops, my corn, potatoes, my garden stuff, not only grew my trees but I grew that which I produced upon the farm. When those trees got so large that they shaded the ground so much I couldn't raise my crops, and at the present time—and I have had to keep thinning them out—I put on not a very heavy application of barn dressing and plowed it under and I kept that piece plowed and harrowed the next year until some time in July, and then I sowed clover or put on something for a cover crop—which will be explained to you later—and the next year I plow under whatever comes up after July, and I don't put on any dressing the next year. And some years I will let it run in clover one or two years, but you need not be afraid to use the plow and the harrow in your orchards. Sometimes I think that the plow and the harrow do more than the dressing. Why, the result is wonderful, what barn dressing will do for our fruit trees. Why, go with me right across from where I live only a few miles to Mr. Ricker's orchard. What have they done? This year they sold 2,600 barrels of apples. Can you realize a man raising 2,600 barrels of apples? He has not used any chemicals of any amount. It has all been done by work, by barn dressing, by the plow, by the harrow. You may talk about your chemicals, but when you get ahead of barn dressing you have got some work to do. We get there just the same with barn dressing as they do with fertilizers. And that is not saying anything against fertilizers. I am experimenting now with them. I am getting a little avaricious perhaps. I don't like to spare it for my fruit trees and this year I bought some commercial fertilizer to put around my trees. The trees blossomed but the frost killed the blossoms and of course I cannot give you the results from that fertilizer, but the trees have grown rapidly, and perhaps some time in the future I can speak more upon the application of fertilizers.

I want to touch upon another point. When you have dressed and fertilized your trees, you shouldn't stop right there. I have

seen trees that have been dressed, that have grown beautifully and blossomed full, but in the fall there would be no fruit. Why? Because of growing all limbs and no fruit. I had a little experience with a pear tree in regard to pruning. I want to give you a few points on pruning, and then I will give way to some other brother. I had a Beurre d'Anjou pear tree that blossomed nicely every year and when it came fall there would be a few scattering pears; when I put them in my cellar to keep them they would wither, they didn't have any sap or juice in them. I said, I will graft those trees—I won't keep them in my orchard. I grafted one of them and I left two limbs that I didn't cut off, and the result was upon those two limbs I raised more pears than I would have raised on the whole tree. It was a grand object lesson to me. As those pears matured they were one of the most beautiful pears I ever ate. I found the fault was in me, the pear was all right. The next year I pruned my remaining trees and the result was I got four or five bushels of as nice pears as you ever say. So much for the pruning of a pear tree and it is the same with apples. Some need pruning more than others. Northern Spies and Rhode Island Greenings need much more pruning than Baldwins. The Ben Davis—well there, I ought to stop right there, the Ben Davis I was going to say you ought to prune right down to the bottom, perhaps I won't say it. Do you realize, brother farmers, you go to one of the agents selling fruit trees and ask what they are doing? Why, half to two-thirds of the fruit trees we are selling today are Ben Davis apples. Can you imagine what the future will be for the Ben Davis apple, an apple you can't sell today in the New England market, an apple today that the buyers say "We don't want it." The European market will find out by and by that the Ben Davis apple is not good for anything. One year ago at this time I was up to Farmington and a man got up there and extolled the Ben Davis apple, recommended it to the farmers, and I have not had a clear conscience since, to stand upon the floor representing this State Pomological Society and have a man get up and recommend the Ben Davis to farmers of the State of Maine. I don't believe, brother farmers, you want it.

NINE BARRELS OF BALDWINS, 1903.

THE EFFECT OF TILLAGE AND COVER CROPS.

Prof. W. M. Munson, University of Maine, Orono.

(Abstract.)

Of the particular lines of agricultural work open to the farmers of Maine, none is more promising than that of fruit-growing. As a rule, however, farmers have made the serious mistake of regarding fruit as one of the secondary farm products. The fence corner, the hedge row, and the roadside have been the places devoted to the apple trees; or in event of there being a definite area set apart as an orchard, some rocky hillside unfit for cultivation has been the location most usually sought. Whether from an inherent dislike to the business of working the soil, or an inborn love for flocks and herds, dating from the time when

> "First Cain was born, to tillage all addicted
> Then Abel, most to keeping flocks affected,"

or whatever the cause, the tendency among orchardists has for many years been distinctly away from cultivation and toward some easier method of handling their trees.

There is an element of uncertainty in all agricultural work. The skilled mechanic may select his material and, applying the principles he has learned, can construct a machine that shall be practically complete and in accordance with his plans and expectations. No farmer or fruit-grower can, however, predict with certainty the outcome of his labors. Nature and Providence have much to do with the processes, and we can only assist the one and submit to the other—we can control neither. As there is no royal road to learning, so there is no royal road to successful fruit-growing, success comes as a result of patient, persistent effort. The man behind the plow is the power which sets at work the various forces of nature and insures the best results that soil and season will permit. We hear much of plant food, of phosphoric acid, potash and nitrogen, of commercial fertilizers and stable manure, but in the absence of a suitable physical condition of the soil, the application of plant food is a foolish waste of time and money.

From the earliest times tillage has been regarded as a necessity, to be disposed of as easily and quickly as possible. Seed must be planted, weeds must be killed and crops must be harvested. To till the soil would seem to be the simplest and dullest thing in the world; and if viewed only as labor, to be most quickly and easily disposed of, this conception of tillage is a natural one—the work must be done because in some way plants thrive best when it is done. At the present time, however, men are coming more and more to till for the sake of tillage; to recognize the fact that there is merit in the mere operation of turning and stirring the soil.

Cultivated plot in 1899. Tallman in the foreground.

The first effect of tillage is to ameliorate and modify the soil itself. Its secondary and most important effects are directly concerned with the plant. The soil is a vast storehouse of plant food, and the first effort of the husbandman should be to make this store available to plants, rather than to add to the already large amount of material locked up. This is just what tillage does. By stirring the soil, food materials are set free, chemical changes are promoted, and moisture is conserved.

The physical condition of soil is nearly always of more importance than mere richness in plant food. The chemical

composition of a soil is not necessarily a measure of its productive capacity, since plant food is of no consequence unless the plant can make use of it. If there is sufficient material available to produce only a stunted growth of trees and grass at the same time, it is evident that the surface application of additional food may temporarily stimulate the growth of both. Hard lumpy soils, however, will not produce good crops, no matter how much fertilizer may be applied, and there is no doubt that the number of "worn out" farms in New England is much smaller than is generally supposed. I have little doubt that much of the benefit recorded by those who have used commercial fertilizers in their orchards, as well as by those who have used stable manure, has resulted from the tillage given at the time of application rather than from the particular form or amount of plant food applied.

Plant food to be of value must be in solution, and must be so distributed that the greatest number of fine feeding roots may lay hold of it. It is obvious that the fine fibrous roots will find their way among the minute particles of a finely pulverized soil much more readily than they will force their way into a stiff clay or through heavy clods. It is also obvious that those soils which are open and porous, which contain a large number of spaces between the particles, will take and retain the moisture to better advantage than will a compact soil—in the same way that a sponge will take up a larger amount of moisture than a block of wood. Now since the amount of water which falls during the growing season is, as a rule, entirely inadequate for the growth of plants during that time this storage or conservation of the melting snows and spring rains may play a most important part in the success or failure of a given crop. By deep plowing and thorough working before the trees are planted, and by continued working and the addition of organic matter by means of cover crops after planting, this spongy condition of the soil which is essential to the best growth of trees and farm crops alike, is best obtained.

But not all New England orchards are susceptible of cultivation in the ordinary way. In such cases some other method of treatment must be devised. A heavy mulch of hay, leaves or sawdust (preferably not fresh sawdust) conserves the moisture and prevents the growth of robber plants—weeds; to this extent

favoring the growth of trees. With this treatment, however, the roots are developed near the surface and in time of severe drought, especially if the mulching is not carefully renewed as required, the trees are liable to injury. In the management of orchard lands it is not so much a question of how the tillage shall be performed, as that it be given. So in lands where the plow cannot be used I say unhesitatingly—though aware that I am treading on dangerous ground—use hogs. From frequent observation of the practical use of hogs in orchards that have reached a bearing age I am convinced that they may be used to advantage. The practice in this case would be to use shotes,

Cultivated plot in 1902. Tallman shown in figure 6 in the foreground.

rather than hogs a year or more old. If six or eight young hogs are put in an enclosure of about an acre, they will during the season, if not too highly fed, pulverize the soil as completely as could be done with plow and harrow, and will in addition serve an important purpose in destroying fruit infested with noxious insects.

I have referred to the use of cover crops under certain conditions, and before referring to specific work in orchard culture, it may be well to consider the purpose of these very useful adjuncts. Briefly speaking, a cover crop is some quick growing

herbaceous crop which is sown in mid-summer for the specific purpose of covering or protecting the land during the winter. Its action is to utilize the moisture and check growth of the trees in the fall; to protect the roots, fix plant food and prevent leaching and washing in winter; to aid in warming and drying the soil in spring; and to add organic matter to the soil. Several crops have been recommended for this purpose but in general practice I know of nothing better than winter rye. If sown even as late as the middle of August, though the ground should not be stirred so late as a late tender growth of the trees may be

Neglected trees lose their leaves early.

induced, it will form a heavy mat over the whole surface of the ground before winter. In the spring the rye should be turned under early, before it begins to spindle, as it is liable to make too much green material to be quickly decayed and thus may cause injury if the season is very dry. Furthermore, if left too long the drying of the soil by the cover crop may be too great and cause actual injury to the trees.

Oats are often used for a cover crop and they serve the purpose of protection very well. They are of course killed in winter, however, and do not assist in drying the soil in spring.

Canada field peas have been recommended, but they make a poor winter cover and are of no use in spring.

In orchards which require an addition of nitrogen,—and what orchard in Maine does not require more of this element—the vetches are strongly recommended. Crimson clover is used farther south, but has not proved satisfactory in this climate. The winter, or hairy vetch (*vicia villosa*) is the one most largely used in orchard sections, and it is almost an ideal plant for this purpose. The cost of seed is almost prohibitive at present, however. The spring vetch (*Vicia sativa*) is a larger leaved and slightly stronger growing plant than the hairy vetch, and makes an admirable cover for fall and winter; but of course the plants are killed by the cold weather. [Photographs taken in the orchard at the Experiment Station May 20, this year, were used to illustrate the points mentioned.]

An additional advantage of cover crops on stony land needs only to be suggested to be appreciated. The loss of fruit during high winds, in the absence of some protection, will frequently be considerably more than the cost of time, labor and seed for the cover crop, to say nothing of the advantages already mentioned.

As to specific results from the use of tillage and cover crops I can only refer you to the work which has been carried on under my direction at the Experiment Station and in the orchard of Mr. Charles S. Pope of Manchester. Mr. Pope's orchard is in the heart of one of Maine's best orchard counties, and is much better suited for studies of this kind than is the Station orchard at Orono. The details of this work are clearly stated in Bulletin 89 of the Maine Experiment Station, and I need only give a summary of results at this time.

For a comparison of the effects of cultivation and mulch, as well as of the use of different kinds of fertilizers, a young orchard of Tallman's and Gravensteins was selected in 1898. The trees were eight to ten years old at this time. The trees were planted 25 x 30 feet apart. The soil was a rocky, sandy, virgin loam pasture with an eastern aspect. No cultivation was given and no special attention paid to the orchard, except to keep out borers and give an occasional mulching, until May, 1898, when the work was taken up by the Experiment Station.

Of that portion of the orchard selected for work, forty trees were placed under cultivation, an equal number were mulched but otherwise fertilized and treated as the first. The adjacent portion of the orchard, planted to Kings, remained in the condition the whole orchard was in at the commencement of the work.

The results were most pronounced from the very first. The cultivated trees took on a rich green color, made a strong growth and retained their foliage late in the season. The mulched trees also made a good growth but not equal to those which were cultivated; while the untreated trees were yellow, made little growth and lost their foliage before the first of October.

Cultivated and sprayed trees retain their foliage late in the season.

The orchard did not come into bearing till 1902, when it was found that of both Gravensteins and Tollman's the number of trees producing fruit was fifty per cent greater on the cultivated than on the mulched land. The average total yield per tree was also about ten per cent higher on the cultivated trees. In 1903 another good crop of fruit was borne; many of the same trees which bore a good crop the year before being among the best ones this year.

The systematic mulching and feeding of the trees adjacent to the cultivated plat have had a marked effect, and these trees

would ordinarily be regarded as making a satisfactory growth. They are not, however, as large nor as productive as the cultivated trees. The untreated portion of the orchard has dropped so far behind as to be out of the race.

As a result of the work above referred to, and of general observation throughout the eastern states, I am convinced that the average New England hillside contains a sufficient amount of food material, or nearly so, to insure good crops if the land is properly handled; and tillage, by improving the texture of the soil, is the key to unlock this store of wealth. By fining the soil, and thus increasing the feeding surface for the roots; by increasing the depth, and thus giving a greater foraging area; by warming and drying the soil in the spring; and by reducing the extremes of temperature and moisture, the physical condition will be rendered best for giving up the accumulated plant food.

In ordinary orchard management mulching may be practiced under certain circumstances; but, where possible, thorough tillage in early summer with a good cover crop sown by the first of August is, I believe, the only proper treatment.

HOME DECORATION.

By Prof. L. C. Corbett, Department of Agriculture, Washington, D. C.

"What a desolate place would be a world without a flower; it would be a face without a smile—a feast without a welcome." Flowers are nature's expressions of pleasure. While flowers are primarily utilitarian in purpose the end is attained by attractive and alluring means. The beauty, fragrance, and sweetness of the flower are not vain attributes; each is designed for a subtile purpose. The bright colors are the gala day attire of these natural fairies to attract and allure the passerby, be he insect, bird, or man. The perfume wafted upon the still night air suggests the whereabouts of the fragrant night-blooming flowers to the moths and other night-flying insects; while the cups of honey at the base of the petals hold a reward for those who have heeded the signal of the color or the odor. The pot of nectar is a sufficient reward for the insect and the transfer of pollen from anther to stigma by the clumsy but welcome guest is the end for which all this beauty, fragrance, and sweetness has been produced. Flowers are nature's expression of love. Love makes the objects of our affection beautiful; flowers are beautiful and therefore expressions of love.

Art is but the imitation of the beautiful in nature. Men make long journeys to study art, to view the masterpieces in oil and crayon. Yet by bestowing a little attention upon a few tiny plants, nature's artists will throw over the canvas of mother earth a background of green upon which she will paint the purity of the lily or the ardor of the rose. If you will but give her the suggestion of your wishes in the form of a few choice seeds, nature will paint for you the rich shades of the pansy or the phlox; she will carpet your floor with a velvet rug of green and strew upon its surface in bold contrast the golden disks of the dandelion or the bright saucy faces of the crocus. She will drape your walls with a festoon of green and hide therein rich gems of purple, of crimson, and of white, and if you ask it, she will screen one apartment from another with barriers of green

which may or may not carry bright floral gems. These wonderful missionaries of nature are constantly at work attempting to cover some ugly scar which civilized man has made in his struggle with the earth to wrest from her the living which he claims she owes him.

In flowers we find, according to our ability to interpret, expressions of beauty, of love, of truth, and of purity. In order to appreciate these beautiful attributes of plants and flowers the mind of the observer must be trained to interpret and appreciate these expressions. The more fully the observer is familiar with the functions of the plant, the structure and purpose of its leaves and flowers the more fully and completely will he appreciate and interpret these subtle attributes. To plant a seed and observe the unfolding of the first leaves, the increasing stature of the plant from day to day and finally its fruition with the accompanying production of flowers and fruit and be able to see in this brief life of but one summer the model for man's existence is in itself a worthy end.

Beautiful plants and flowers naturally grouped are pleasing because they are restful anl quiet. Association with nature is soothing because the crudities of man's invention in which friction is such a large factor are all eliminated. The sounds in the woods are musical, harmonious, and rhythmical, soothing, and pleasing in effect; the colors are beautifully blended and harmonious; they hold the eye and the attention without effort and without fatigue. Nature in such moods is restful.

While man can not call in upon a small place these larger and broader expressions of nature, he can pleasingly use a limited number of the factors which go to make up this final result for the purpose of adding beauty to his abiding place. Trees may be used to give protection from wind and sun. The varieties may be so chosen as to give expressions of pleasure, of restfulness, of sprightliness, or of sorrow. Trees have all these expressions and they influence to a great degree the lives and characters of the persons who daily go among them. It therefore behooves us in selecting trees for the adornment of our home grounds to choose those with pleasant and elevating, rather than those with somber and depressing, expressions.

Trees are not only attractive while in leaf and capable of giving refreshing shade but after the beautiful autumn tints have

all disappeared and the broad bare arms of the tree stand out they become interesting particularly if the tree be of some age. While in a deciduous condition many trees particularly the oaks become exceedingly picturesque. The strong arms with perhaps many scars tell the story of conflicts with the elements which have wrested from them a part of themselves but by weathering the storm the tree as a whole has assumed more the carriage and attitude of the triumphant hero. The angle at which the branches leave the main trunk, the size, and distribution of these branches are all factors which contribute to the general expressions of the plant. The black gum with its straight central axis and numerous small lateral branches spread out in a horizontal position are particularly attractive and are quite distinctive. In addition to this interesting and distinctive feature this tree transforms its rich glossy summer garb to a most beautiful one of crimson and dark shades of red during October. The pin oak is somewhat similar in its habit of growth although its branches are in general more drooping and its autumn coloring less vivid.

While trees must be relied upon as the general structural or framework part in the adornment of a place, shrubs, grasses, and annual flowering plants make up the detail. And it is the detail which gives finish and completeness to the place as a whole. It frequently happens that in attempting to recall a particular building, room, or painting some one detail may serve to give the mind a clew to the whole; the general plan or outline may be lost and a single factor of the finish serve to identify the whole, hence the importance of these finishing factors. Shrubs are important and satisfactory because when once established in their proper relations to one another as well as to the general scheme of improvement, each year adds to their beauty and their value. Not so with the annual planting. It is the one factor through which novelty and variety may be introduced, trees and shrubs may be considered fixtures while annual plants serve as pictures which may be shifted from season to season to suit the pleasure of the occupant. Annual plants too are the only forms of embellishment which a tenant will ever care to bestow upon a place. Annual plants give quick returns and large profits from a small outlay of time and labor.

The range of size, variety in foliage and bloom afforded in the list of annual plants which can be successfully grown from seeds

each year is sufficient to enable one to quite successfully secure, by their use, temporary effects which it would take many years to obtain from shrubs. While no one should feel content with this form of emergency planting yet new places and temporary locations can be greatly softened and beautified by the judicious use of these annual plants.

THE USE OF FLOWERS ABOUT THE DWELLING.

Annual plants which have a suitable habit of growth and adequate foliage may be made to do duty about the dwelling and upon the grounds in the place of the more appropriate shrubs, and perennials. The one great drawback to which such annual plantations is subjected is the yearly destruction by the first hard frost of the season. This scene is particularly unpleasant. It is not at all agreeable to observe the blighted forms of the plants which for a season have by their charm, appropriateness and beauty become one's daily companions. The scene of death and desolation which follows the frost is not pleasant to contemplate, but aside from this one feature, which it is hoped will not impress others as it does the writer, the annual plants such as cosmos, castor bean, sunflower, aster, zinnia, and flowering sage may all be made to serve as substitutes for shrubbery plantations until the shrubs themselves have grown to sufficient size to command the situation.

Tall growing, broad leaved plants like the castor bean can be used with advantage as screens for drive ways or walks, by placing a mass of the plants in the bay of the walk or drive. Tall growing plants of this description when massed against buildings, fences, or other obtrusive objects serve as attractive and efficient temporary screens. Low growing plants are more effective when massed in borders along the boundary of the place with taller growing annuals or shrubs as a background than when used in beds at the front or side of the dwelling. In fact the formal bed either in the shape of an oval, circle, or star in the center of a greensward is generally more obtrusive than pleasing. The next best place for the annuals after the border is in masses about the foundations of the building. And if vines of a temporary nature are desired some of the rapid growing sorts such as *Cobea scandens*, the Moonflower, Morning-

glory, or Cypress vine may be appropriately used for training over fences, walls, or about porches.

When annual plants are desired for the bloom which they produce, to be used for cut flowers, the best disposition for them is to plant them in an area set apart for a flower garden or to devote a portion of the vegetable garden proper to the purpose. When grown for cut bloom merely, the most satisfactory and economical plan is to plant them in long rows with ample space both between the rows and the individuals in the row. Unless the plants are given ample room for full development the flowers which they produce will be inferior in size and in form. For best results from the plants to be used in this way rich soil, ample space, and good culture are essential. While it is advantageous to sow the seed thickly at planting time in order to insure a stand of plants it is equally desirable to have the plants thoroughly thinned in order to provide ample space for their full development. If the flower garden is a distinct feature of the place and its mission is to furnish an attractive retreat as well as cut flowers its general plan may be more pretentious; the straight rows may give place to irregular groups or masses or even to formal beds and designs, so long as these are not made the leading feature in the general adornment of the place. In fact curved pathways in the flower garden allow an opportunity for demonstrating the fitness of certain plants for special purposes. The bays of the curves can be filled with tall growing, dense foliaged plants for the purpose of hiding the beds or groups which lie further on. Curved walks are more pleasing than straight ones and lend themselves more kindly to the needs of the different classes of plants which find a place in the home flower garden. If the flower garden is to be a permanent feature of the adornment of a place the walks may be arranged to conform to the contour of the land or if level may be given some geometrical character or design, and made permanent by use of gravel and grass borders. If a fixed design is to be adopted the soil in various areas of the garden may be so modified by the addition of sand, muck, or clay and the use of plant foods as to suit particular areas to the needs of special plants. Those which enjoy a dry sandy soil can be provided for while those which thrive best in a heavy soil can also be accommodated. If on the other hand a less formal and fixed character

in the garden seems desirable the whole area may be annually spaded or plowed up; the walks given a new course and the general scheme of planting changed. Such an arrangement will give variety and novelty to the garden and for most purposes will prove quite as successful as the more formal arrangement. During wet times, unless the soil is of a sandy character, the lack of graveled walks will prove a disadvantage.

THE GREENSWARD.

The grading and making of a lawn are two of the most important operations in connection with the adornment of a place. The greensward is the canvas on which all architectural and floral decorations must be placed. Nothing is to me more pleasing than a well made and well tended lawn. Now-a-days we hear much about the beautiful in nature, about the beauty of the over grown, unkept fence corners, the straggling briars and the like. I admit that these features make beautiful pictures when the subjects are well chosen. The bramble when allowed unrestricted development is charmingly graceful and pleasing, and the tall grasses, the golden rod, and the aster are all appropriate to a sylvan roadside or the corner of that most picturesque of all fences—the rail fence. But place these naturally graceful plants against the foundation of a well executed piece of architecture and note the effect. Even a rustic cottage must be built of rough slabs or logs in order to harmonize with such surroundings. The farm home, the suburban place, or the village lot must leave these pastoral features out of their scheme of adornment in order to prove pleasing and effective. The old saying that "when in Rome do as the Romans do" is as good for the adornment of a place as for one's demeanor. By that I mean that well kept lawns, closely cropped, if you like, with the lawn mower are more in keeping with the rigid lines of shingled or clapboarded house than are the conditions of the roadway just mentioned even if the one is formal and artificial. Graceful trees, shrubs, and flowering plants show to better advantage upon a cropped lawn than they do in an abandoned lot. While it should be the aim, in all work of adornment, to modify the natural characteristics of things as little as possible in order to have them conform to the object before us; yet true harmony

and conformity with the character of the place should always be foremost.

While trees, shrubs, flowers, and grassy lawns are all essential to our highest enjoyment and while they are important factors in the development of one's higher nature yet it can not be said that these attributes are essential factors in the maintenance of human life. We are told that man has three primary wants, namely, food, clothing and shelter. The trees, flowers, shrubs, and grass contribute to one of these primary wants only—shelter. But no home acre whether in the town, village, or country can be considered complete unless it has upon it the means of meeting, in part at least, one more of these primary wants—food. The home acre should be provided with a fruit garden as well as with a vegetable garden. One will not materially interfere with the other and both will contribute liberally to the support and comfort of the family. The satisfaction of serving fresh fruits and vegetables of one's own growing is in itself a pleasure for which it is worth striving. One does not appreciate these privileges until deprived of them. The resident of the country with a good garden, an ample supply of fresh fruit in season and a cow and chickens, knows nothing of what it means to supply the wants of every meal from the market house. It is often said that the variety from the home place is limited and restricted to certain seasons. This if true is not necessary. A few hotbed sashes will greatly extend the seasons at both ends. A judicious selection of crops with frequent plantings throughout the season will insure lettuce radishes, peas, beans, onions, beets, cabbage, turnips, spinach, tomatoes, etc., in succession from early spring to late autumn. With no system of horticulture can so much be secured from a given area in one year as from a well planned and well tended vegetable garden and yet only about fifty per cent of the farms of the country even so much as maintain a vegetable garden. This condition of affairs exists in the face of the fact that the census shows the area devoted to this use is about five times as remunerative as the same area devoted to the grains or to cotton.

In the State of Maine there are 59,299 farms 27,392 of which maintain vegetable gardens of one-third acre in extent, that being the average size of garden for the farms of the State. The estimated return per acre from these gardens is $64.73 while

the value per acre of the cereals grown in Maine is $12.81 which is considerably above the average value per acre of such crops for the whole United States which is only $8.02 per acre. Stop for a moment and compare these statistics. The value of each acre devoted to home garden purposes in the United States is $49.42 against a return of $8.02 per acre for all lands in the United States devoted to cereal grains which are considered as staple crops.

We must not be mislead by these comparisons, however, for only a small acreage in vegetable as compared with the cereals can on the average farm be made to pay. The point is right here if the supplies for the table which it would take five acres of grain to *purchase* can be grown on one acre will it not be profitable to cultivate that one acre in vegetables? Aside from the actual money value which comes from the garden there is another which cannot be overlooked, it is the value of vegetables as well as fruit as a factor in one's diet. They give variety and by so doing prevent one from tiring of the heavier essentials which admit of less variety. I have reference to the flesh diet. There is not so wide a range in meats to choose from. Then too, most farmers depend largely upon home production for the meat supply and, if this is the case, the range is limited by the poultry yard, the pig pen, and the pasture, which may contain either beef or mutton or both. Here is the possible rather than the actual range, poultry, salt fish, and pork in one form or another will, I venture to say, cover the variety in the meat diet in 75 per cent of the farm homes of our country. While this is a sufficient range a constant diet of meat and potatoes will soon grow monotonous, but with fruit and vegetables in season the sameness in other articles is lost sight of, fruits and vegetables have, therefore, a worth aside from their market value.

Since the vegetable garden must be looked upon as an economic factor in the maintenance of the home, the expense of caring for the garden itself must be considered. It will naturally cost less to maintain a farm garden than to maintain a garden upon a town lot or suburban place. Upon the farm, land is not so much of an item. The garden can be made rectangular in form, the crops can be planted in long straight rows and the greater part of the cultivation given with horse

power implements. Upon the town or suburban place unless one owns a horse the work of the garden aside from plowing in the spring will be done by hand. Notwithstanding this I will venture to say that I believe there are a larger percentage of gardens maintained under these more difficult conditions than are maintained upon the farm. The trouble is farmers as a class do not appreciate the value of small things like the garden. They do not maintain a garden, neither do they use vegetables, they get along without them, and yet it is safe to say that if the vegetable garden were to be properly maintained that the actual profit derived from it would be more than the averages above stated.

While it is not possible to produce statistics to illustrate the value of fruit in the economy of the family, I am convinced that their value is even greater than that of vegetables, particularly from the standpoint of dietetics. The actual money value of the fruit which can be produced on a carefully planted and cultivated acre will be equal to that from the vegetable garden. To illustrate what can be planted on an acre I will give you a list of the plants which are now growing upon one acre at the government experiment farm. The list is as follows: 25 standard apples; 5 crab apples; 45 peaches; 32 dwarf pears; 10 standard pears; 18 plums; 18 cherries; 9 quinces; 50 dewberries; 150 blackberries; 150 red raspberries; 150 black raspberries; 75 currants; 50 gooseberries; 80 grapes, and 1,000 strawberries. With the exception of the peaches there is not a fruit in this collection that can not be successfully grown throughout New England. Local growers can give the names of the varieties which will prove most successful for each locality, as well as those which will cover the greatest period. In apples, for instance, those which ripen from July to October can be chosen and the late ripening one should again be divided among early winter and late winter sorts in order that the supply of fresh apples may not be interrupted for more than three months at most. It will not be possible to secure such a wide variation in season of maturity in the other fruits. Yet attention to the selection of early and late maturing sorts will materially lengthen the season for strawberries, raspberries, cherries and grapes. From the list of plants already given it is an easy matter to form a rough estimate, at least, of what may be obtained from an acre so planted.

Although there are 1,867 individual plants upon this acre of land it is so planned that practically all the cultivation can be done with horse power. While the strawberries are planted to form matted rows all other plantations are so arranged as to admit of horse cultivation in both directions. Beside affording a supply of fruit for the average family such a fruit plantation will afford the amateur ample opportunity to carry out any novel ideas he may entertain in regard to pruning, training, hybridization, etc. In this day of intense commercialism the amateur art of fruit growing should be encouraged in every legitimate way. It was from the horticulturists of this class that the present commercial generation received not only their knowledge but their inspiration and it is to this class rather than to the commercial growers that we must look for the future improvement in varieties. The amateur has a beneficial influence upon the community for he teaches from the text, *quality*. The education of the purchaser and consumer reacts upon the commercial grower to force him to grow fruits and vegetables of superior quality rather than making *quantity* alone, his goal.

Fruits and vegetables have an æsthetic as well as a commercial value. A sprig of parsley served with mutton or turkey makes a pleasing contrast and whets one's appetite; a salad is never so inviting as when served on a nicely blanched, crisp lettuce leaf, and a table is never better dressed than when garnished with inviting trays of crisp nutty celery. These fresh, delicately flavored products of the garden beside adding beauty to the table give relish to the meal. They are as useful in their sphere as are cut flowers and potted plants in theirs. Fruits and nuts both fresh and preserved are highly esteemed as foods and in addition they have as well a decided æsthetic value. Fruits lend themselves to table decoration as kindly as do cut flowers. The variety in color offered by apples, peaches, plums, grapes, and the other small fruits which can be grown at the north afford a pleasing and appetizing dish for each season. And during autumn when the great wealth of the region's fruit harvest is on a dainty dish laden with luscious apples, peaches, pears, and grapes is an offering worthy of the palate of a prince, aye, I may say, the palate of a *Freeman*.

We pride ourselves on our schools, our colleges, and our political institutions, and seem to forget that these are only

products of higher ideals. But man himself is a product of environment and without natural influences which are in themselves elevating and stimulating these institutions of which we are justly proud could not have been attained. The same climate which paints the cheek of the apple and gives perfume to the rose instills into its inhabitants an appreciation for all the higher things of life.

As we consider the possibilities of the country in which we live, the productiveness of the soil, the variety of the vegetation which it is capable of supporting and the utility of these products we are not living up to our opportunity when we fail to provide fruit, flowers, and vegetables for the table and shade and shelter for the home.

CIVIC IMPROVEMENT—WHAT HAS BEEN DONE IN OTHER STATES.

By Mrs. Emma Dow Armstrong, President Maine Federation Women's Clubs, Lewiston, Maine.

This subject upon which I am asked to speak tonight is not a new idea at all any more than is the other topic of which we hear so much, the woman's club movement, which I have the honor to represent. Then we also hear much about the "new woman" herself, but the latter, like the former, is the same sort of woman that her mother and grandmother were before her—the same devoted home-keeper and home-maker, the same unselfish mother of boys and girls, only perhaps with this difference, she keeps in touch with husband and children through her larger opportunity. As to the clubs and the civic improvement work, they are old—women never. In order of precedence comes the village improvement society and then the woman's club not far behind. So my text should be "There is nothing new under the sun," and the misleading word, new, disappears. This civic improvement idea is but the education of men, women and children to appreciate, enjoy and help along the movement toward a cleaner and better kept city or town or village, a more beautiful environment for the home and the city dweller.

Maine's beautiful seacoast, her towns and villages, are the resort of thousands, yea, tens of thousands of the wealthy residents of other states, for many months of the year. As a sure commercial investment, this beautifying of our State is one of the best arguments in its favor. No town or city can afford not to live up to its greatest possibilities in this respect. A beautiful, well-kept town, with clean streets, homes and public places well cared for, well shaded and well watered streets, goes far towards attracting permanent residents.

Civic improvement was the theme of four discourses Sunday in as many churches in Orono and a meeting of the citizens is called for Saturday to form an organization which shall co-operate with the town authorities in seeking the improvements that even the best villages in Maine constantly need. Let the good work go on!

Miss Rebecca S. Clark, the beloved "Sophia May" of juvenile literature, has given the brick building at the end of the bridge to be used for library purposes and as a home for the "Village Improvement" society in Norridgewock.

These are some of the things which the Civic Improvement Leagues are trying to accomplish to arouse a public sentiment which shall demand a better grade of municipal housekeeping. It has an imperceptible effect on the citizen himself. He respects his city or town where his surroundings are elevating and takes more pride in his own personal property. I received a letter from a friend traveling through the length and breadth of the United States who says of the laboring man in these newly beautified towns, that every one of them has the manner and bearing of a college president.

But I was to speak of some things that have been done in other states. I hardly know where to begin, but with the wondrously beautiful old town of Stockbridge, Mass., to which belongs the honor of the first village improvement society, organized fifty years ago, last August. Although this was before the era of women's clubs yet this society owed its origin to a woman, and to the summer visitors, who were so shocked at the unlovely, untidy condition of this favored village, as regards its natural advantages that Miss Mary Hopkins formed this society, to improve local conditions, by better roads in place of the muddy, uneven streets, reclaiming waste places, securing

decent sidewalks, eliminating shabby, ill kept fences, weeds and other abominations, many of which abound.

The first year $1,000 was raised and 400 trees planted, streets lighted, drainage made good. All this work was made possible by aid from the town council. The society paid one-half the cost of a new railroad station, half the cost of a little park about it, planting it out to trees and flowers, so that first impressions of a trip to or through Stockbridge should be good ones. Now they have a beautiful library, drinking fountains, parks, streets, monuments to Revolutionary heroes. Cyrus Field gave $10,000 for a park. They erected the second monument in the country to heroes of the Civil war. And so the good example of these cultured, intelligent people of Stockbridge has made the name of their little town famed for its beauty in two continents. Lenox has the wealthiest people in the country as summer residents, because as adjoining town, they share the renown and vie with Stockbridge in making it beautiful. Aside from personal satisfaction in living in the midst of beauty and order the small amount of money invested by this Laurel Hill village improvement society was the best investment ever made, for the value of property has risen fabulously.

In Honesdale, Penn., the citizens joined hands with the avowed purpose of making theirs the model town of Pennsylvania. They converted the river bank into a park, and a frog pond also. They attacked two of the most offensive sights in town, making them the most attractive. This has been done by the woman's club and through their influence scores of other women in the state have taken up the work. They offer prizes for the prettiest back yard, neatest streets. Owners of vacant lots are compelled to keep sidewalks in order and weeds cut down. Their pastime is to plant trees and make flower beds, also direct the work of drainage and sewerage.

The National Cash Register Co. of Dayton, Ohio, put an idea in practice for making the grounds around the shops attractive. They have employed John Olmstead, the landscape gardener, to lay out the factory grounds and grounds of houses owned by the company, and now Dayton is famous all over the country for its beautiful homes of the working people. They have transformed the worst suburb into a blossoming paradise.

They formed an association and are doing splendid educational work through lectures, illustrated by stereopticon slides. They offer prizes for the best kept lawn, the cleanest alleyway, the prettiest back yard. Today, practically all South Park is organized to fight dirt and disease and beautify the town as well as the individual homes. Street vies with street, square with square as to which shall be most beautiful. For obstinate cases, the camera and stereopticon did the work pictured on the canvas. No one wanted to see the unsightly places pointed out as his own. A certain street, peopled by washwomen, etc., was too great a problem. So the superintendent invited them all to a dinner at the rest rooms of the factory, gave them a course dinner, with waitresses and the stereopticon showed up their street afterwards in contrast with other renovated places. It did its work and the washer ladies joined the association to a woman. In this suburb every tall fence is covered with beautiful vines, thus serving a double purpose, shutting out the omnipresent bill poster and beautifying the town. There is not a lamp post or telephone pole but is wreathed in vines. One street is pronounced by authorities, the most beautiful in the world, size and cost of homes considered. Think you that all this outlay of time and money has not paid? It has—and will. Social economists in this country and Europe are copying their plan.

All over the country, from Bar Harbor to California are these societies being organized. Every state has scores of these organizations. The women of Petaluma in California were ashamed of local conditions, but what was everybody's business was nobody's, yet the women organized the Ladies' Improvement club. They have raised and spent $3,000. Their first work was to redeem their plazas, two right in the heart of the town. They planted palms, graveled the walks, grassed the whole, placed seats.

They asked the electric company to paint poles white, use only good straight ones, water hydrants to be painted red. All these things tend to enhance the beauty of the place.

This work of civics is no new departure for women, for 200 years ago, in New York city, a woman had sole charge of street cleaning, the widow of Andreas Down, who drew annually a salary of eleven pounds sterling, but Chicago has the honor of

being the first city in the world to appoint women as sanitary inspectors.

Montclair, N. J., has an association with many committees who have accomplished great things, fountains, clean streets, well lighted and paved—their motto is patience, push and persistence. The florists gave 5,000 chrysanthemums and 1,000 salvias, with instructions to the children of the towns of Montclair and Orange and a fete of the flowers is to be held in the autumn, with prizes for the best diplay.

One of the beautiful residence suburbs of Cincinnati, Wyoming, is laid out with its streets in curves, instead of straight lines with parks at frequent intersections. Here an improvement league was formed one evening. The next forenoon over 400 trees were planted, then followed the cement walks. These curving streets are most beautiful and the center is a fine oval park. Harrisburg has long been synonymous with civic work. Its civic club, formed through the efforts of Miss Myra Lloyd Dock, in '98, sent to Europe to get ideas on forestry and civic improvement work by governments, has or had two years since, 150 active members. Non-active members pay twice the fee for active members and men are eligible. Its educational department has 8,000 members. Once a month meetings are held in the school buildings, addressed by its members. As results demonstrate the usefulness of a measure, we cite what they have accomplished. Men are uniformed as were Col. Waring's White Wings, and keep the whole city patrolled, picking up and keeping clean the city streets. Receptacles for rubbish are placed; an ordinance was secured by which spitting is forbidden on pavements on penalty of $5.00. They reclaimed and beautified river banks. A nature library is loaned to rural schools, shrubbery is planted, and summer play grounds are maintained with a teacher in constant attendance. Five members of this club serve with thirty members of the board of trade in a movement to secure a loan for improvement work. Landscape artists are planning changes in ill-kept parks and open spaces.

This would be but a poorly-told tale were I to omit mention of work in St. Paul. It has been called "the Transformation of St. Paul." The first work was with the legislature. After bills had been introduced which seemed to be lost and the session was within five days of closing, a committee of three women resur-

rected the bills, got them through and signed by the governor in three days. The bill, one of them, provides that trees may be planted by the park board and at a cost of $5.00 per tree, not more, and the actual cost is $3.00, and expense to be assessed against property owner. The women worked quietly and carefully on the sanitary and garbage question—they tried to have these matters turned over to the health department. But for months there was war—contractors, pulls, and public opinion were to be fought, but they were victorious and facts and figures won out. The system was changed and money legitimately used in these departments.

I read an account recently of how the work began in Texas. The University of Texas sent a delegate to the American league —his ideas are right to the point. He said: We had Daughters of the Republic and Colonial Dames and all that—we're proud of them—but they didn't seem to help the city forward at all. Then they federated the clubs and got together, doing the best they can with their own peculiar needs.

In Florida they have improvement and cemetery associations. The latter work fell to the women, because it had to be done and the gentlemen did not do it. They also built a new school-house, furnishing it with blackboards, chalk, maps, etc. The settlers are from the North and have Northern ideas. No grass is their complaint. Remembering that "Whoever makes two blades of grass grow where but one grew before—," they planted grass and trees and have as good lawns as in the North. The Cleveland Home Gardening Association is doing good work along various lines—48,868 packages of seeds were sold to school children at a penny a package. In September, the results were shown by exhibitions of flowers in the various school buildings. Parents and friends were invited and these children had their first experience in cultivating the soil. After this 3,000 bulbs were purchased and distributed, after being potted. Each room had four or five and the children took great interest in the plants. This so wrought upon the park commission that they planted a muddy spot in one park with 50,000 bulbs, which was an event in the city annals when they came into blossom. One of Cleveland's daily papers now offers a prize of $60.00 for best garden; second best, $30.00; best porch or window box, $25.00; second, $10.00. Is it any cause for wonder that Cleveland is world

renowned for its beauty? I wish time could be taken to tell of the eight miles length of Euclid avenue, with its four rows of arching elms, the well-kept lawns between the trees; the beautiful residences of John Hay, John D. Rockefeller and many other well-know men.

It seems unnecessary to multiply examples of what has been already accomplished by this new civic awakening. The movement in Washington, that already most beautiful city, by the appropriation of $15,000,000 by Congress for the erection of new public buildings, parks, monuments, etc., is only another evidence of the hold this idea has upon all classes and conditions.

There is practically no limit to the channels by which the clubs have shown their interest in the work—not all have the same necessities; not all the same interests. We must choose our work according to locality, needs and possibilities—enough has been cited of what pluck and perseverance can do to encourage the faintest heart, even when we cannot begin at the beginning of things—the laying out of the city or town. To quote from "Modern Civic Art," the "Bible of Believers in the City Beautiful," as Mr. Robinson is called: "As when the heavens rolled away and St. John beheld the New Jerusalem, so a vision of a new London, a new Washington, Chicago or New York breaks with the morning sunshine upon the degradation, discomfort and baseness of modern city life." "There is born a new dream and a new hope. Within these is the impulse of civic art. Cities grow in splendor. There are new standards of beauty and dignity for towns." What inspiration these words give to the hopeful worker. What has been effected in other states and cities can be made applicable to our own—the greatest factor in the work is the education of the citizen to demand for himself the best there is, for as one has said, "The people still rule." The value of beauty as an asset is recognized by even the great commercial institutions as we have seen. It would be like the play Hamlet, with Hamlet left out, to close this talk without allusion to the great work undertaken by St. Louis.

St. Louis has been preparing for a fair in which they hope to interest all nations and it would be a spectacle for them to present to their visitors, the condition of things in which St. Louis found herself. When Prince Henry of Germany made a visit to St. Louis it took $60,000 to put her streets alone in a presentable

condition so that the royal prince might look upon them without disgust. So this matter of civic improvement was a matter of pride which easily touched the movers in this world's fair project. It was a very easy matter for them, with this pride about the looks of their city, to be made to see things as they were and to undertake their betterment. The city they thought should be made not only attractive but it should be made a model city so that visitors from this country and other countries could take pattern from the things that had been accomplished in St. Louis. So they took up this matter of civic improvement.

The first thing that was done, when the matter had been talked over among a certain few who had the interests of the city at heart, was the purchase of Charles Robinson's book, "Civic Awakening, or the City Beautiful," and six copies were purchased by a woman belonging to one of the clubs. She had read the book herself and she knew the inspiration that came from it. She took the six copies and put them into the hands of men who had a large influence and men that she thought would be interested in the work. They were so much awakened by it that they passed them on to others until those six books had a very large circulation. Then the next movement was a lecture by the professor who is at the head of the American League for civic improvement in Chicago. He was brought from Chicago and a lecture illustrated by stereopticon was given. After that they had an architect from Philadelphia who gave them a talk and in that way they worked up the public feeling until there was an interest sufficient to start upon the work. Then they sent out circulars. Then they organized their Civic Improvement League, and from that time on there never has been the slightest trouble in getting funds to carry on whatever work they needed. It can no longer be said of St. Louis that she is down at the heel and out at the elbows, as it has been repeatedly said, and also that she was very much averse to reform. Then they interested the newspapers, and that of course was one of the greatest forces that they have had in their project for carrying on this work. It would have been impossible, they all say, except for the interest that the newspaper men have shown in the work, it would have been impossible for them to have done what they have accomplished. The women in St. Louis, after this public awakening became so general, were so wrought up over the work

that they went out into their own street and cleaned them themselves, and that was certainly a move in the right direction, for it set a good example. So that by the time the St. Louis fair opens next spring I think that they will be able, as they say and as they promise, to show us the model city of the United States.

Besides this work in other states as I have spoken of it, the request came to me a few minutes ago, to say a little about the work in Lewiston and Auburn, to let the people from out of town know that we have been trying to do something of that sort among ourselves. Last spring there was a meeting called for consideration of the subject. It was a small meeting but it was a helpful one and we had addresses from several persons who were interested in the work, and very soon we organized a Civic Improvement League. The work has been done in a very small way both in Lewiston and Auburn, but still we are hopeful of larger results in the future. Every great reform has its discouraging beginnings and its day of small things. But here, as in other places, we began by trying to educate the children as well as the older people to pick up and keep clean the streets, and to that end we have caused to be placed several—as many as we were able to—receptacles for garbage upon the corners and upon the most popular streets so that they can be kept clean in that way to a large degree. We have placed rest seats at the corners of the streets where people would naturally wait for the electric cars; as far as our money would allow us we have done that. Through the influence of the League in Lewiston the park has been very much improved. We have had a large number of seats put out, which the mayor consented to do at the request of the ladies. There was a large stretch of walk upon one of our principal streets that had long been an eye-sore, and that sidewalk was replaced that had long been a menace to the public on a dark night. We have improved a little park at the head of Pine street, putting out a bed of hardy hydrangeas there that will grow in beauty and be larger and more beautiful every year. At the instigation of the League there was a bed of geraniums placed around the soldiers' monument. I have addressed the teachers myself on one occasion, asking them to interest their pupils in the work and they have done so and have responded very kindly, and also the superintendent of schools. The matter of offering prizes to the school children for the best essay upon

clean streets is now before the League, and I presume that will be done, and one of our assistants in Lewiston has offered to give a prize to the grade in the grammar school which will produce the best essay on clean streets. In Auburn the matter I think has been attended to by the chairman of the committee, Mrs. Atwood, and beautiful urns of flowers were placed upon the public library grounds. They have also placed rest seats at different places, and receptacles for waste. And so gradually we are hoping to arouse a public sentiment to demand what we know needs to be done and will have such an influence over the tendency toward carelessness and filth and dirt and disease that lurks wherever there is a chance for it in an illy kept, poorly taken care of, city.

Prof. Phelps: It seems to me that this subject of civic improvement is one that we should look at from the very broadest standpoint, and the two standpoints which I wish to call to your attention are the pecuniary advantages of civic improvement and the cultural or educational advantages. Now the pecuniary advantages cannot be better illustrated than by the outcome of our relations with Cuba. Previous to the Cuban war our whole southern coast was menaced by that dread disease of yellow fever and the whole foundation of it was the filth and degradation in that little island of Cuba. That was the source of the whole contamination. What was the outcome? As soon as the United States took possession of that little island she sent a commission over there to clean up those cities. Those cities were thoroughly cleaned up and since that time we have heard nothing about the dangers of yellow fever along our southern coast. Now in a similar way results of the same kind may be obtained locally. Wherever filth and dirt exists there are the conditions which favor the growth of disease germs and fungous organisms and all those things which tend to propagate disease, and if you remove those conditions then you are working an improvement that will be of advantage to the whole city or the whole town. And so from a pecuniary standpoint you are doing a great work of public interest.

Then again, from a still more direct pecuniary standpoint, what do our great railroads find? They find, as you have already heard, they find that it is an advantage to them to decorate their lines. They have found it out to that extent that

some of the great railroad corporations are employing today landscape gardeners, as they are called, to go along their lines and make improvements about their depots so that it will become more and more attractive to travel and to the public, and in that way it is proving a pecuniary advantage to those corporations. In the same way it will be a pecuniary advantage to any city to make public improvements by building better roads, by having better sidewalks, by having better kept streets, by having more parks along their streets.

But it seems to me that a still broader view should obtain of the whole subject, and that is the improvement from an educational or cultural standpoint. Now take a great exhibition of fruits of this kind. Do not you suppose that whoever comes in here and enjoys the beauty of these flowers and these fruits goes out a better man or a better woman than he was when he came in?—absolutely cannot go out a worse human being. And you will find that in general the highest type of mankind, of farmers let me say, are those who are interested in the cultivation of fruit and flowers. I think I am safe in putting that, with no derogatory influence or intention with regard to all other classes, yet we find among the fruit growers and the foresters as high a type of character as you will find in any class of farmers that can be named.

Now the educational influences of civic improvement are great all along the line. If we can do something to interest our children in the cities in the cultivation of flowers, in the cultivation of fruits and in a greater appreciation of the beauties of nature, we are doing much to elevate them, to carry their minds into grander and nobler spheres and to carry them away from the evil and the degradation which we all know is too common in our cities.

Let us look at this subject, therefore, from the broadest possible standpoint and realize that we are elevating and educating our boys and girls as well as our men and women.

AT THE HORTICULTURAL SCHOOL.

Miss Louise Klein-Miller, who was one of the efficient instructors at the Winthrop Horticultural School in a communcation in "The School Journal" said its object was "to interest the young in the study and enjoyment of plants, flowers and fruits, and both the boys and girls, who will soon take the places of the fruit growers of today, some practical affairs of fruit and flower growing." The different schools were visited by the instructors in the morning, and the general sessions were held in the afternoon and stereoptican lectures in the evening. Suggestions were made by the instructors for improving the school grounds. Miss Miller especially urged the importance of using the beautiful native shrubs, which can be secured without money and without price from pastures, swamps, roadsides and woods, and showed combinations of color and texture of flowers and leaves which produce good results in landscape gardening. A lesson in propagation by cuttings was given using a geranium plant for the illustration. Seeds, bulbs, perennials and shrubs were distributed to the children. Miss Miller's illustrated lecture in village improvement was much enjoyed by a large audience. The principal of the high school told Miss Miller before leaving, "No one can estimate the value and influence of the work that has been done here." All the instructors did excellent work and a few weeks later a village improvement society was organized, and its members find many opportunities for the improvement of the town.

Perhaps the Pomological Society may have been a silent factor later in the introduction of a speaker upon nature studies at the State Teachers' Association. The reports of the enthusiastic reception given to this speaker indicate that our teachers will no longer hesitate to do more of instruction along this line than in the past. Let us have more in the future.

Save along general lines it has not been regarded as any part of our work to teach nature study, at the same time that which relates to the growing of the plant or tree touches the vital part

of fruit culture. He who has learned to make the plant or tree grow, has gone far in learning the art or science of growing fruit. Much remains to be learned even then, so it may always be a pleasant duty for the Pomological Society to teach still more of the mysteries of plant life, that the young people as they learn other things may also learn well the lesson of fruit growing.

SCHOOL GARDENS.

By Dick J. Crosby.

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The school garden is just now attracting a great deal of attention among educators, and rightly so. As an elementary feature of our rapidly growing system of agricultural education it has as much right to be as have the Sloyd room, cooking laboratory, and sewing room of our manual training courses.

School gardens are modern institutions but they have come to stay. No concerted movement for their establishment dates back more than thirty-five years. Aside from Germany where two or three states gave encouragement to the establishment of school gardens over eighty years ago, Austria and Sweden were leaders in the movement and were practically contemporaneous in giving official encouragement to it. These countries were followed by Belgium, Switzerland, France, and Russia in the official establishment and promotion of school gardens. The German government has not taken up this work in an official way, but through local initiative a great many excellent school gardens are being maintained, among them some of the best we have in the world.

In the United States school gardens were unknown twelve years ago; now they are found in fourteen or fifteen different states, and in perhaps fifty or seventy-five different cities and towns. What was probably the first school garden in the United States was started in 1891 at the George Putnam Grammar School, Boston, by Henry L. Clapp, master of the school. For nine years this garden was devoted exclusively to wild flowers,

ferns and a few hardy cultivated flowers; but in the spring of 1900 a kitchen garden was started on a vacant lot in the rear of the school yard, and has been continued successfully up to the present time.

To the Massachusetts Horticultural Society is due, in a large measure, the success of the George Putnam school garden and the establishment of other similar gardens in New England. In 1891, and every year since, this society has offered annual premiums of fifteen, twelve and ten dollars, respectively, for the

School Gardens on the grounds of the U. S. Department of Agriculture at Washington. These boys and girls kept their gardens free from weeds and watered them only with a rake.

three best school gardens entered for competition. The first prize has been taken every year by the George Putnam school, and I am told that the fifteen dollars thus secured has covered all expenses of the garden. These three annual prizes have been directly instrumental, also, in the establishment of school gardens at Medford, Wenham and other towns in Massachusetts, and the reports of these gardens, published by the society in its Transactions, have influenced the inauguration of similar work in other states, until now we find gardens not only in con-

nection with the common schools, but also in connection with normal schools, technical schools, social settlements and factories in many different parts of the country.

I mention garden work in connection with social settlements and factories. Strictly speaking this is not school garden work but so closely is it allied with it that no clear distinction can be made. Children, in most cases school children, do the work and in nearly every instance it is so conducted as to be educational.

So favorable has been the impression created by the successful experiments made in school garden work in this country that many different institutions and organizations are now either undertaking to promote the work or are seriously considering the problems connected with it. The lack of teachers capable of conducting work of this kind has led to the introduction of school garden work in many of our leading normal schools. State departments of agriculture, State agricultural colleges and the U. S. Department of Agriculture are devising means for promoting the work. The latter is now making arrangements to have school gardens in full operation at the Louisiana Purchase Exposition next year. Last year the American Park and Outdoor Art Association devoted one afternoon session and part of an evening session to the consideration of school gardens, and during the ensuing year two committees of the association were at work preparing reports on different phases of the movement which were presented at the Buffalo convention of that association in July, 1903. On the same evening that these reports were being presented the National Educational Association was devoting an entire session to papers and discussions on school gardens.

Educators everywhere are coming to see that the child must be given something to do as well as to study; they recognize the value of the "laboratory method." The school garden is a laboratory—a nature study laboratory. It does for the children out-of-doors what the chemical laboratory, the carpenter shop and the kitchen laboratory do indoors. It trains the eye and the hand along with the intellect, and at the same time gives pleasurable employment and physical exercise in the open air and sunshine. To many pupils in the city it opens up a whole new world: Nature's life romance, a divine pastoral abounding in

amusing little comedies and the most intensely interesting tragedies—the struggles for existence—all this at a time when every impression made upon the child mind leaves an indelible stamp. And not only does it arouse interest in the many phenomena of nature thus brought under the directed observations of the child, but it also gives zest to many otherwise dry exercises that the skilful teacher correlates with it.

Children's gardens, Georgetown, D. C. This garden was once part of a paved court surrounding the stone slave market seen in the background.

KINDS OF SCHOOL GARDENS.

Two fairly distinct types of school gardens are found. In one the ornamental features predominate. The children assist in planting the school grounds with wild flowers and shrubs, or cultivated flowers, ornamental plants and trees, or various combinations of native and introduced plants. Ordinarily, in gardens of this type the æsthetic features are emphasized, though not always to the exclusion of other valuable instruction. The children may learn, to a certain extent, the principles of plant growth, the reasons for pruning and grafting trees, the best

methods of combating insect pests and fungous diseases of flowers, shrubs and trees, and many other practical details in maintaining pleasant home surroundings.

In the other type of school garden—the vegetable garden—we find the economic element predominating. Children are frequently allowed to plant flowers in connection with vegetables, but this feature of the work is usually incidental to the instruction in growing useful plants. Usually the garden is divided into small plats, from four to ten feet wide by six to twenty feet long, and one or two pupils are made responsible for the care of each plat. Here they plant lettuce, radishes, beans, potatoes, and other farm and garden vegetables, learn to distinguish them from the weeds that threaten to choke them out, become familiar with their habits of growth and methods of reproduction, discover numerous insect enemies and other pests that require great ingenuity to eradicate, and gradually acquire a nomenclature that adds greatly to the stock of words in their growing vocabulary.

Such gardens do not lend themselves to the realization of landscape effects, but furnish many valuable lessons not to be acquired in the ornamental garden, where, as a rule, all of the pupils work together. Among other things they develop a sense of ownership and awaken a greater personal interest. With this sense of ownership comes a growing regard for the property of others. It has been found in the education of incorrigible boys that allotting to each boy a plat of ground upon which he can raise what he will and enjoy the fruits of his labor has a powerful influence in overcoming the tendency to indulge in petty thieving. Furthermore, the few experiments in school garden work that have been carried on in this country long enough to give tangible results indicate that children who have engaged in work of this kind at school acquire a wholesome respect not only for the individual property of others, but for city property and other corporate property, for the shade trees in the streets and the shrubbery and flowers in parks.

The individual-plat system, also, more than any other, fixes personal responsibility. There is no chance to shirk it. If any plat shows neglect, the teacher knows where to fix the blame. If another shows excellence in design or painstaking effort, the teacher knows where praise should be bestowed. It has been

found in schools where this system has been tried that to deprive a neglectful pupil of his plat and give it to someone else has been one of the strongest incentives to continuous and painstaking effort. After a pupil has prepared his ground, sown his seed and bestowed some little care upon the plants that have come up, he very much dislikes to have the fruits of his labor enjoyed by someone else.

THE VALUE OF SCHOOL GARDEN WORK.

School gardens increase the interest of parents in the schools —and there is need of an awakening of parental interest in this direction—active, potential interest, not the passive kind. Statistics for 1900, published by the bureau of education, show that less than seventy per cent of the children of school age in the United States were enrolled in school. Many parents need to be shown that the school is preparing their children, not only for greater usefulness, but also for greater commercial productiveness. This last consideration is a very sordid one, I grant, but it is, nevertheless, one that has great weight with parents who toil with the hands from sun to sun, and save to the last penny for the bare necessities of life, and who have never seen anything but the same kind of toil ahead for their children. Convince these parents that the school is preparing their children for lives of less drudgery, and they will somehow provide means for keeping them in school longer and more regularly.

School gardens arouse an interest among the pupils, and thus promote more regular attendance and longer continuance in school. The average attendance for 1900 was less than sixty-nine per cent of the total enrolment, and only forty-seven per cent of the total school population. In other words, our common schools attained an efficiency of about forty-seven per cent. More than half the children who should have been in school were running the streets or working in factories.

This condition is partly the fault of the parents, but it is also largely due to the lack of interest in school work on the part of the pupils. If the pupil is really anxious to be in school he will usually find a way, and he will also find a strong public sentiment to encourage him. On the other hand, it is very easy for the pupil who has lost interest to invent excuses for staying out of school a day or two, a week, or for dropping out altogether.

And some parents will connive with their children to devise excuses.

The school garden is in the same category as nature study, manual training and domestic science. In fact, it furnishes the most rational basis for nature study work. It furnishes the growing plant in an environment much more natural than the flower pot in the school room, and much more available for city children than the virgin forest or the open field. Nature study excursions are in many localities impracticable, and in all cities they make relatively heavy demands upon the time of the school children. The school garden is near at hand, always available,

Childrens' gardens overlooking the Hudson River in New York City. The chickens are given a daily walk in the garden.

and the time devoted to it need be no greater than is now given to "waking-up exercises" or other diversions intended to relieve the monotony of study. School gardening should be put on the same basis in our schools as manual training and domestic science. To a limited extent it should be required of every pupil in the lower grade, but further than that it should be made optional, just as manual training and domestic science are now optional in many of our best city schools. Not every boy is interested in manual training, not every girl in cooking or sew-

ing, but a large majority of them are interested. The same is true of school gardening. It is also true, frequently, that some pupils who care nothing for the mechanic or domestic arts find gardening intensely interesting.

In this connection it should be kept in mind that school gardens are not intended to make farmers or market gardeners any more than manual training courses are intended to make master mechanics. They are intended rather to awaken an interest in outdoor pursuits and to furnish opportunity for a complete rounded development of the child's faculties. In the more advanced grades is it not as reasonable to allow the scholar to elect gardening (call it elementary agriculture, if you will) as to allow him to elect manual training or a business course; as reasonable to teach boys some of the outdoor features of home-making as to teach girls the indoor features? Scores of our smaller cities depend for their very existence upon the surrounding agricultural industries. Is it not as important that our growing youth shall be given a knowledge of the principles underlying these industries as that they be taught the ways of the counting house and the factory?

The cost of installing school gardens is merely nominal in comparison with the cost of installing equipment for manual training or domestic science. The cost of the land and a few hand tools is about all. The special teacher will be needed just as in the other courses, but the teacher of gardening can, in most cases, take charge of instruction in botany. One of the great needs of the present is a corps of teachers capable of carrying on such work, but the normal schools and agricultural colleges are putting forth strenuous efforts to meet the demand. In the meantime, progressive teachers all over our country are meeting the emergency by training themselves; that is, by undertaking a limited amount of simple garden work and at the same time reading everything available on the subject and spending vacations in summer schools. It will not be long, let us hope, before all of our best schools are giving adequate attention to courses of study that will furnish our children as good opportunity for coming into intimate and cordial relations with Mother Nature as they now have for learning the intricacies of man's numerous inventions.

NATURE STUDY.

By Mrs. V. P. DeCoster, Buckfield, Me.

Within a very few years nature study has come to the front in many of our public schools, as a most important study, and yet the parents who have never had the advantage of such studies have only a general idea that it is to teach the children the names of a few flowers, insects and birds.

In reality, the study is so broad, that it defies definition and only a small number of its benefits can be mentioned. The best definition I have ever read is by Prof. Hodge. "Nature study is learning those things in nature that are best worth knowing, to the end of doing those things that make life most worth the living."

It is impossible to realize the truth and meaning of that until one has studied for herself. During the past century, education has been limited too much to books. The best educators now realize that the most good is derived from facts found out by children in practical ways and from personal observation.

Too many children have been through school with the idea of the little girl who recently brought home a pumpkin seed, and told her mother that the teacher said that although the seed was white, the pumpkin would be yellow.

"And what will the color of the vines be?" asked the mother.

The little girl replied that the teacher had not taught her that.

"But," said her mother, "you know, dear, for we have pumpkin vines in our garden."

"Of course I do, but we ain't expected to know anything until we are taught."

Nature study teaches the child to see and investigate for himself, and to draw his own conclusions.

We sometimes call a child dull because he cannot easily learn arithmetic or spelling or some studies made by man, and yet the child when put out of doors with the remainder of his class and set to solve some problem of nature will be found to have the keenest observation and the most talent to put it to practical use. What are our great inventors except people who have watched and studied and utilized the forces of nature.

Life, everywhere, has been growing too artificial. People now are beginning to turn back to Mother Nature. What brings a host of summer tourists to your beautiful lakes and hills? It is not wholly to escape the heat of the cities, it is a desire to get out into the heart of nature, with peace and quiet.

What would our agriculture be today better than that of our ancestors if there were not people everywhere studying seeds, plants, fruits, insects and animals? The love of flowers and animals is born in every child and should be fostered and encouraged from infancy, otherwise childhood loses its greatest value.

Only a few days ago a neighbor said to me "My little girl brought home a lot of dirty bugs and water in her dinner-pail last night and I didn't know it and spilled it on the table and I told her to throw them away and not bring home any more."

"O, why did you do it?" I said. "Now you have nipped her study in the bud. My little girl brought home some too, they were tadpoles and caddice worms and diving beetles, and I put them into a jar of water so the children could watch them."

It is the very foundation of a farmer's success that he becomes interested in nature study when a boy. When taken up in a school it is wonderful how it will unite the scholars. I have found some boys who seem almost ugly and unapproachable to become so interested that they will do any amount of work and be the most interested in fixing up schoolhouse grounds or searching for rare specimens. At this time of year especially when everything is coming into life children will spend their recesses and noons in exploring all the nearby woods, brooks and fields. It gives them interest, exercise and knowledge; improves their health and moulds their characters. They have no time for quarreling or low thoughts when interested and busy out of doors.

Maine has a wonderful variety of wild flowers unknown to most people except the real flower lovers. It is not wild flowers alone which I would advocate teaching. It's not every farmer's boy or farmer himself who knows that the perfect flower must have both stamens and pistils and that sometimes these essential organs are found in separate blossoms and on separate plants. I know a man who set out a fine strawberry bed which grew handsome plants and blossoms but no fruit and he did not

know what was the matter till some one told him they were all staminate blossoms.

Some people wonder why more of the cucumber and squash blossoms do not set, because they do not see there are two kinds of blossoms. Take the children into the garden with you, show them the importance of the corn tassel as it sheds its pollen down upon the silk of the ear, and explain that not a single kernel of corn will grow without the pollen. Explain how the beets and turnips, etc., are storing up food in their roots for another year's growth which we appropriate for ourselves.

How many people know that we would be overrun with plant lice, if it were not for a dainty little green-winged insect called the lace winged fly, whose larvæ are called aphis-lions, and they are truly lions among the aphids.

We are all the time talking about how to destroy the insect pests. And yet very little is said about our insect friends which we have by the thousands. If bees never gave us a drop of honey, they would be of inestimable value in pollination. Even Grandsire Longlegs and Miss Lady Bug are valuable friends. Nature seems to have so arranged matters that whenever any species of insects threatens to overrun the country, some parasite or disease increases in like proportion for their subjection.

Now we can't expect the school teachers to teach our children all these things and it wouldn't do them much good if they did. The object is to once get the children interested and to form the habits of observation and investigation and then furnish them with proper reference books to help them out. A few choice books of good authority are of untold value. Then we must take time to go out to play with them once in a while ourselves.

Let the men eat a cold lunch once in a while, while mother goes on a picnic down to the brook or off in the woods. It will do her as much good as the little ones. Every boy and girl brought up in a farm home, who experiences a happy childhood will have a full appreciation of what the word home means. There is a feeling of peace, security and ownership which the majority of city children know nothing about who live in rented houses, flats and family hotels. It is a feeling which I cannot describe in words and which children think little about until grown up, when they begin to have hopes and aspirations for homes of their own. I once heard a sweet little woman who

had lost her husband and was without home or children, say, "When I drive past comfortable farm houses in the evening and see the bright light shining out and imagine the family group within, I always have to cry." There was the lonely heart-ache for a home of her own.

You will notice that many people who go from the farms to the city and acquire a competence, come back and buy the old farm to spend their declining years. They hope again to feel the peace and security which they felt in childhood, playing and working on father's farm. But where there is one man who makes money enough to come back and buy the old farm, there are ninety-nine who would like to do so but never save enough money. Do we as men and women appreciate our advantages, our independence of the rich? our freedom from worry about fuel, food and rent?

Many city people have the same idea of us that a poor young man had whom I overheard a few days before Xmas, when the stores were filled with Xmas gifts. I was riding on an elevated car in Boston and could not help overhearing a conversation between two young working men. One was telling the other about the Xmas trees for sale. "Why," said he, "they ask from fifty cents to a dollar and a half apiece for them here. Those farmers, down in Maine, are just getting rich out of them. They work on their farms in the summer and raise a lot of stuff and when it comes fall all they've got to do is just to go into their woods and cut these Xmas trees and send 'em up here and make from $400 to $500 a carload."

No wonder the poor fellow thought we farmers have an easy time while only a few blocks from there were long lines of people, men, women and children, at the coal yards waiting their turn to get 100 pounds of coal, which was all they would sell one person and that at an exorbitant price. Women with children in their arms and sick ones cold at home waiting for a few pounds of coal. Do you appreciate your wood lot as you drive in over the pure white snow and haul out your life-saving fuel?

O, the beauty, the grandeur, the freedom of life, working among these living, growing things, co-operating with nature, gaining our living from mother earth! If only the man's soul is large enough to overlook the unpleasant parts, to realize that what is drudgery to many is only the necessary part to make

them appreciate the beauty. How can anyone love nature and not love God! We can hear Him in the birds and seen Him in the flowers.

I am aware that farm work means hard work, with hands and brains and often soiled clothes and disagreeable labor, but I know also it is work which means health, independence, freedom, self respect, and self support. It does not mean the broken down nerves of a school teacher. It does not mean the dyspepsia of a stenographer. It does not mean the consumption of a clerk or factory girl. It does not mean premature old age and the broken constitutions brought on by hundreds of sedentary occupations. It does not mean being rung in or out of work by factory bells. It does not mean the worry of losing your situation and finding another. It does not mean a menial servitude to others.

But it does mean health, happiness, prosperity, independence, fresh air and free sunshine in God's out-of-doors. It means co-operating with nature, in watching things grow, in developing perfection, in using one's brains. It means sound sleep at night. It means steady nerves. It means a business of your own, without submission to others, and with a constant incentive to study and improvement in your line of business. It means a pride and enjoyment in your business. It means a hospitable home, and to the earnest worker I do believe it means enough money and leisure for some longed for study and travel.

CHRYSANTHEMUMS—THEIR CULTURE AND VARIETIES.

By Abel F. Stevens, Woodside Gardens, Wellesley, Mass.

I wish to say that at the many exhibitions at which it has been my privilege to act as a judge I have never laid the awards on a finer exhibit or better grown fruit than I have in this hall.

Before I say a word about these gems of my heart and love, I have a few things to say before I begin, as the Irishman said. From early youth to this day I have always had a love for beauty in nature, and I am so glad that all our institutions throughout our land, our public schools which are the hope of our Nation, are doing so much in nature study. I shall ask your attention for a few moments to a practical paper. I will not read you an essay or give you an oration, but try to impart from my practical experience as a florist and as a grower of fruit some things that if these amuse you and please you that you can go and do likewise and grow them.

Among all the gems of the floral kingdom which lengthens out the year and adds sunshine to our hearts, and which stands without a peer among flowering plants as an effective decorative flower, we willingly ascribe to the chrysanthemum the well earned title of the "Queen of the Autumn," covering a period of fully one-fourth of the year with its magnificent blooms, and for ornamental and home decorations it has not a rival. The rapidity with which it has come into favor, the multiplication and improvement in varieties and the modern system of cultivation are without a precedent in the florist's experience. In fact, the business of selling and the quantity planted by amateurs and professional florists for cut flowers and selling plants has, in the last five years, increased as 1,000 is to 1, until now the chrysanthemum is considered as indispensable as roses or geraniums.

It was introduced into Europe from China in 1790 and it was not till 1795 that the first plant bloomed in Colville's Gardens, King's Road, Chelsea, England. While in our country it was about 1870 before their culture began in earnest and in 1885 the first exhibition of this grand flower alone was held in the

United States. While today every large city from Maine to California holds its annual "chrysanthemum show." America, England and France—each a "national society." In the earlier years of the plant only the Chinese varieties, consisting of the reflexed and incurved large flowered, the anemone and pompons were cultivated—later the wonderful Japanese varieties—with their long tubular or flat-twisted petals were introduced and since by crossing the varieties have become so intermingled that the lines of demarcation have almost become obliterated.

All new varieties of course must be produced by sowing the seed. It has been said that "growing seedlings is the poetry of gardening" and I know of no flower offering greater inducements or more quickly realizing results in growing from seed than the chrysanthemum. Many new seedlings often bring from $100 to $1,000 each.

The bright sunny days of our beautiful autumns are very favorable for maturing the seed. The requisites for success are sunlight, air and a dry atmosphere. The principle objects in hybridizing or cross-breeding are improvement in color, form, size or vigor of plant, and success will depend largely upon a proper selection of the parent stock.

Having a definite object in view select the nearest approach to what is desired. Sow the seed February 1st in boxes of rich, fine soil, give gentle heat and proper degree of moisture. April 1st transplant these seedlings in richer soil, six inches apart and by June 1st pot rapidly growing plants into seven-inch pots, then plunge these pots into the open garden soil. Give plenty of water during July and August and by September 10th lift them out, place these plants in shed to greenhouse to protect from frosts; give plenty of water, light and air until they are through flowering.

PROPAGATION.

In the propagating of named varieties the cuttings should be struck by the first of February and grow them in a cool house near the glass until April 1st, then transferring them into cold frames, giving abundance of air and moisture. May 10th these plants may be set out in open ground. Place them three feet apart each way. Nip in monthly the rapidly growing shoots, to produce stocky growth and proper shape to plants. If they

have had good soil and culture they should be three feet in height and the same in diameter by August 15th, when they should be taken up and repotted. Use good rich soil made by well mixing two-thirds old rich pasture sods with one-third old stable manure. Set the plants into ten-inch pots, press the soil firmly and wet plants thoroughly. Let these potted plants stand for three days in partial shade then plunge into open ground till September 10th, when lift and bench the plants, giving ample room and light. Plenty of water, disbudding and training must be attended too—removing fully one-third of all buds set, give air freely, and as the terminal buds set, water with Guano water every three days until plants are in full bloom. If mildew appears on the foliage, evaporate sulphur, place tobacco stems about the pots. Keep the plants well staked up and blooms well tied and you will be rewarded abundance of regal flowers.

BEST VARIETIES.

In making up a collection, there are three points to be considered, i. e., 1st, varieties that will furnish flowers throughout the entire season of bloom; 2nd, a desirable assortment of colors; 3rd, plants of a vigorous growth that will produce fine, perfect flowers. The following list includes both early and late flowering varieties, comprizing both the reflexed and incurved petaled sorts covering the best selections from Chinese, Japanese, European and American varieties.

Three Best Varieties.

White—Timothy Eaton, Merza, Wivens.
Yellow—Col. Appleton, Modiste, Golden Wedding.
Pink—Maud Dean, Vivian Morel, Shenandoah.
Lemon—Marion Henderson, Phila, Cheltonia.
Red—Leonides, John Shrimpton, Shilowa.
Bronze—Kate Bromhead, Brutus, Lady Roberts.

POMPON VARIETIES.

Yellow—Savannah, Onita, Alliton.
Red—Douglass, Nota, Casco.
White—Nuspagh, Tam O'Shanter.

"OSTRICH PLUME" VARIETIES.

Wm. Falconer, Louis Boehmr, Mrs. Hardy.

Variegated—Leopard, Striata Perfecta, Moseman.

This list is the cream of 1,000 varieties, covering all species, all varieties and all colors.

The beautiful chrysanthemum is ever welcomed in the homes of all flower loving people; it supplies a long felt want; it comes at a time when there is a dearth of flowers, for the summer varieties are past and the winter plants are not in bloom. For house decorations, either in plants or cut blooms, it has few equals, for with proper care they may be kept from three to four weeks in good condition if placed in vases of water, changed every morning and kept in a cool room during the night. With the prestige already attained we shall expect the beautiful chrysanthemum to hold its rank as the favorite autumn flower. Most truly thou art the "Queen of the Autumn."

Prof. MUNSON: There is one question which may require a little explanation on the part of Mr. Stevens as there might be a little misunderstanding in regard to using sulphur when the plants are affected with mildew. Will you please explain just how you use the sulphur in the greenhouse?

Mr. STEVENS: We take an iron kettle and take the flowers of sulphur and just light it in the avenues or the walks of our greenhouses and just about the foliage. I have found nothing whatever in all the fungicides that we have that will destroy the creeping mildew upon the foliage so rapidly and so efficaciously as that of the flowers of sulphur. Only be careful that it does not flame into a blaze so there would be injury from the heat, and keep it where the fumes can rise—close the ventilators and doors for a short time. Occasionally we take a little water, dissolve the sulphur in the water and put it around the foliage. One thing, the varieties I show you, of the sixty-five varieties, there is not one of those that is subject to mildew. In all our growing of seedlings and in hybridizing and the formation of new varieties, that is one object we have kept in view, that is, to produce a handsome strong foliage. As the Good Book teaches without the blade no corn, so no matter how charming the flower may be and the blending of the shades and the colors, unless it has a good vigorous constitution it is not worth propagation in the seedling.

AMONG FRUITS AND FLOWERS.

Prof. A. L. Lane, Good Will Farm, East Fairfield.

Nature holds a wide place in memory and she holds that place very tenaciously. Recall the scenes of your childhood, the meadow, the brook, the deep-tangled wildwood, and every loved spot that your infancy knew, and see how clearly and distinctly they stand out before you in your vision. Literature abounds in the same element; the literature of the Bible which begins with the garden of Eden and ends with that beautiful city where there are trees bearing fruit for the healing of the nations.

My own childhood was fortunate in location. As a boy I had the privilege of occupying a position just a few miles from this city, ten miles from the leading city in the State, on the outskirts of a country village by the side of a beautiful river—Royal's river was a royal river to me and I well remember walking along its banks, especially one particular trip on an autumn day when alone I walked up the banks of the river for nearly three miles and back again on a delightful sunny afternoon, finding hazel nuts and wild grapes and wild crab apples and a variety of fruits along the bank of the river, and all the while the most delightful autumn scenery that one could well imagine. I remember with pleasure now as I look back upon it the hours spent in my childhood in driving the cows to pasture, some mile from home, across this beautiful stream and along a country road until I came to the pasture where the boxberry plums were ripe in the early spring and where blueberries and huckleberries and raspberries and blackberries grew here and there in clumps and where the work of my especial errand had other fruit accompanying it than just the fruit of the work being done itself.

A little later it was my privilege to study botany with an older sister who did the work in the text-book and permitted me to do the work in the field, and the combination was so successful that I received then an impulse toward the love of nature and the study of nature in the open air that has not left me, and nothing is more delightful to me today than a long tramp after some special flower. Let me speak of just one taken recently.

Two successive mornings I spent the time from early breakfast until school walking way into the country about two miles and back again, to be rewarded each time by just a few specimens of the beautiful fringed gentian. At last on the third occasion, I called a small boy to my assistance and received from him directions to cross over into the field where the cedar trees grow and I should find what I sought. And to my great delight and that of the friend who was with me we found an abundance of those beautiful fringed gentians in full bloom, the largest number that I have found at all in this part of the State. The only other time that I have found them at all like it, and that of course far exceeded it, was between Thomaston and Rockland where they grow exceedingly abundantly in the fall and where they have the beautiful blue color that the nearness to the sea intensifies. A large place in literature nature holds as well as in memory. Constant change is the characteristic of all nature's processes.

When does the year begin? Suppose one wished to spend a year with fruits and flowers, at what time of the year should they begin? He may begin at any time of the year. If the question were asked me, When does spring begin? O, I should say without hesitation, it begins some time in September or October; certainly the spring is well on by the early November days that we are now having. You may find in a brief walk, hint after hint of the presence of next spring already. Our newspapers have reported strawberries in full blossom, strawberries ripe, raspberries in full blossom, raspberries ripe, during the present warm fall. To what year do those strawberries that we now gather belong? To what year do the late blossoms belong? I passed my neighbor burying his cultivated strawberries with brush to protect them from the severity of winter, and by the roadside within a few feet I picked strawberry blossoms in full bud. Did they belong to that particular year or were they early foregleams or forerunners of the next year? Certainly, the latter. We can say that the late dandelions which bloom by the roadside and other flowers that come to cheer us as if to bid us good-by are really the heralds of the coming spring, coming beforehand to remind us of the spring that is coming so soon. From the fringed gentians and the witch-hazel blossoms which come, as we all know after the

leaves have fallen, and adorn the branches of the trees with their slender yellow petals after the leaves have fallen, so that you can see them as you ride along the road, see them by the roadside, from the fringed gentians the late witch-hazel blossoms it is only a narrow step to the early wild catkins and the later catkins of the coming spring, in fact you may find the alder in full bloom in the fall, even the pollen yellow upon the catkins, so that the interval between fall and spring is, as it were, bridged over by the fact that spring flowers come in the late fall anticipating the following spring, and occasionally, of course, the fall flowers go on later and later until they hold sway close up to the reign of the snow and the sleet. The interval then during which winter holds absolute control is very slight and the reign of winter is broken all the while by the fact that try as it may it cannot exhaust the current of vegetable life that flows on and on until it makes the complete circuit of the year, in hidden root, in bulb, in stem, in bud, wrapped up safely from the winter's harm of the life that all the while is in a state of semi-activity and all the while waiting for the first warm days of spring to call it into full action. We cannot say that for a single moment the life current stops in the vegetable growth about us, but that the year is continuous. It is admitted that the few ferns which remain green through the winter, that the leaves of the boxberry plum plant, the leaves of the checkerberry, the wintergreen—the trailing wintergreen or the checkerberry, that these are living all the while. These do not have the vigorous life of summer but nevertheless it is true that in mid winter nature is full of life, ready to manifest itself at the first favorable opportunity in the spring, so that the year is continuous. The spring flowers come on, the skunk cabbage blooms in the swamps—I am sorry to say not in swamps near Waterville because it does not grow there, but in different parts of our State it pushes up its little red hands as it were in the very midst of the ice in the wet, damp places and unfolds its blossom before the leaves come. Other flowers come; the hepatica comes. I have found it in April when wading through the snow drift, on the south side of the woods—the hepaticas in full blossom and the butterflies flying about from one flower to another. Then the trailing arbutus, the Mayflower, and others follow on and on in rapid succession until the full throb

of the plant life is on and the ring that girdles the year of vegetable life has its thickest part set with the floral display of the spring blazing like a rich jewel set in a golden rim. And then it reaches its height and we have the composite flowers of summer, we have the asters, and the golden rods of the early fall and the fringed gentians, and then the witch-hazel blossoms and the forerunners of the spring, and the winter seems to shut in the scene and close it all. And yet there is not a day in the year when the botanist may not go into the woods and find abundant material for study. He may take his snowshoes and let the drifts lead him nearer and nearer even. He may watch the way the birds are being fed by the kind Providence watching over them, even in the dead of winter. Does God take care of the birds? Yes, because I have seen him in the very act of doing it. After a severe snow storm I went down to a little brook in the rear of the house where I was living then, and looked across the stream and saw a flock of birds flying about from place to place and feeding upon the tops of little weeds that stood up just above the snow. The wind had blown the snow away from the place where these herbs were and had piled it up around the roots of the bushes where it was needed to protect the roots of the bushes from the cold. And it left bare the stems of these weeds and from weed to weed and plant to plant the birds were flying and eating their fill as they lighted upon each one and then going to the next one. God had swept the snow away,—otherwise it would have buried these weeds,—and given the birds a chance at his table.

The life that seems dead through the winter springs quickly again into activity in the spring, and what a beautiful type that is of resurrection. The life remains apparently dead, and into quick new life it springs at the call of the sun each spring.

Plants gird the year with perpetual life. Fruits come very near making a complete belt—complete, golden, beautiful belt around the year. If we speak of fruits as they are stored up, they do. "We always have fresh apples in our home," said an intelligent farmer, "the late apples keep until the early apples are ripe in the summer, so we always have a supply of fresh apples in our home." Any one who will intelligently cultivate apples may reach the same result. There may always be a supply of these beautiful specimens of fruit, of such fruit as we

have these beautiful specimens here before us, in our homes, with proper selection and proper care. Of course taking this into account, the way in which fruits can be kept, they girdle the year. But even without that, the break in the year's continuity is but very slight. Into the late fall fruits remain still upon the trees, a variety of fruits, a variety of nuts, which are only another form of fruit, until the snow buries them, and in the spring when the snow melts away again, under the oak tree you may pick up and eat, if you choose, the acorns that have lain there, kept snugly under snow all the winter long. The squirrels lay up their supply of nuts not because they need to do it, because they cannot find them in nature but simply because the snow would otherwise bury them beyond their reach, it would be too hard a task for them to dig them from the snow and the ice. If the snow were not there they would have no need of storing up their supply of nuts. And indeed, in mild winters they get the greater part of their food by running about from tree to tree, from the cones of the evergreen trees and the nuts which they find here and there upon the ground. Our winter birds find abundant supply of food. They come down from further north and spend their winters with us. They do not starve. Those beautiful birds which you sometimes call robins, they tell you "The robins are here, I saw them in the apple tree"—well, they saw something there that looks something like a robin, the pine grosbeak, that come in flocks. They spend the winter along the streets of our villages and cities and eat the apples hanging on the trees. They find plenty of food here and there elsewhere, in different ways they find plenty of food. They do not starve. And so the chickadee in our woods sings his little song cheerily all winter long and finds no trouble; nature provides bountifully at her table for all the life that must depend upon her supply, and it is only because of the snow burying it so frequently that there is any distress at all. Of course man could not live without the forethought and provision of laying up for himself in this climate, but even here the year is girded with its circle of fruit as well as with its circle of flowers.

As the spring comes on the activities begin again in nature and the first flowers come, the flowers that you all look for as among the very first, the skunk cabbage, the hepatica, the bluets,

the arbutus, and one after another the ladies' slippers, the pink, and the white and the yellow, the pink and white being varieties of the same thing and the yellow a distinct species, and then best of all that great showy ladies' slipper, which is almost as good as a chrysanthemum, standing two or three feet high, found so abundantly in the arbor vitæ swamps above Houlton, and found within a few minutes' ride of Waterville so I have filled a tub to the great surprise of every one who never imagined anything like that could be found within easy reach of Waterville. Then that little dainty orchid, the calypso, or the calypso spectabilis, that also, a rare, dainty, beautiful orchid, grows in the cedar swamps, within a few minutes' drive of the central part of the city of Waterville, and it grows also in the vicinity of Oakland and other places in the State.

So that we have with us, if we will but look for them, abundant plants and flowers to reward all our search and all our study.

I will not detain you with even the abstract of all that I had thought to say, but simply say that I thank you for your attention at this time of the evening, and I believe that any one whose heart is once opened to the sweet influences of nature will find a growing fondness for everything that God has made, and will find his own life enriched, his own thought enriched, his own happiness enriched, will find it a great delight and pleasure to become more and more intimate, as he may by careful study and by actual observation with everything bright and beautiful about him in nature. The very plants will preach to him sermons of life and death and resurrection, will bring him hope and cheer in hours of disappointment and sadness, and will make him glad that he lives in a world so beautiful, glad that the One that made this world so beautiful for us may make another world even more beautiful for us in the life to come, glad that there is to be a resurrection from death, glad that this life does not end all, but that an immortality awaits us all, prophesied so plainly in seed, in bulb, in plant, in the resurrection of all nature in the spring time, another step simply, sowing in sadness and reaping in gladness.

DEFINITENESS IN HORTICULTURE.

By Prof. F. W. Rane, New Hampshire Experiment Station, Durham, N. H.

To make a success in anything, I care not what it is, a person must have a comprehensive idea of it. With this well understood, the subject before us, "Definiteness in Horticulture," may be considered. As farmers we should have a definiteness of purpose which shows itself in our system of rotations, adaptable crops, etc.

With up-to-date methods of farming I am sure horticulture will appeal to us in some of its various forms, and it is only those of us who attain to this degree of proficiency that will make much success. A poor farmer will rarely make a successful horticulturist. Horticulture is more intensive than general farming, and to my mind is the cream of agriculture. It may be that horticulture will remain as of secondary importance as it is today on our farms for some time, but the thing of utmost importance is that whatever is attempted should be with definiteness in view. If in spite of our neglectful methods, fruit growing brings the most profitable crops found on many farms to-day, what, I ask, can we make of it if given more definite consideration? With a wholesome public sentiment in favor of even apple growing, to say nothing about the innumerable other horticultural crops, New England can be made a country unsurpassed.

We can say without hesitation that the apple crop is a sure paying crop everywhere in New England. Of course different sections differ more or less locally as to soil, exposure, etc., but by studying the existing conditions the problem can be easily solved. With the rapid development or evolution of American fruits there are varieties adapted to all conditions of soils and climates. With the introduction of Russian blood we have varieties of apples and cherries that withstand even the severe winters of northern Vermont, New Hampshire and Maine. Already we find such varieties of apples as the Bethel, Arctic, Oldenburg, McIntosh, Wealthy, Pewaukee, Wagener, Scott's Winter, St. Lawrence, etc., coming from these sections in

wholesome competition. This is indicative of what can be accomplished when men set about it to overcome obstacles. I attended a local fair at Bethlehem in the midst of the White Mountains a few years ago and to my utter surprise found that the horticultural displays of not only flowers and vegetables were fine, but their fruit represented as many varieties and exceeded in display, anything that I saw that season. I was informed that the Baldwins were grown in a protected place, but the other fruits simply received the ordinary care customary in that climate. When such a display can be grown in the heart of the White Mountains we need not complain of our conditions elsewhere. One man is reported as growing a few acres of strawberries that year, and selling the product at an average price of 12½ cents a cup, which is equivalent to a pint. Surely strawberries are hardy everywhere and it only demonstrates what the possibilities are in cold climates with this crop. Mr. Howe of Lancaster, New Hampshire, is a large apple grower in that region, and says the Bethel apple is to that section what the Baldwin is to southern New England. When I was on a lecture trip with the Maine State Board of Agriculture, one year ago last summer, I found that the Arctic variety of apples is being very largely planted in the northeastern part of the State. I was surprised also to find when on this trip a gardener at some distance north of Bangor growing and shipping all kinds of small fruits for the Boston market. I might go on further to demonstrate that even in our colder sections of New England the possibilities for successful horticulture are even greater than is generally supposed. Here as elsewhere the man at the helm is the larger half of success.

For central and southern New England little need be said upon what we can grow here. This society has listened to such men as Hale of Connecticut, on the peach, and others equally experienced and successful with other horticultural crops. The results of such men assures us of the success of the specialist; now with definiteness of purpose and an understanding of their culture these products can be raised equally successfully in a limited way on the average New England farm.

Can we estimate with any degree of accuracy what can be expected in the various pursuits on the New England farm? This is a question well worthy of our consideration. I thor-

oughly believe it is our duty and privilege to estimate and figure out our chances for success or failure in all farming undertakings. No one should undertake a business who has not the possibilities at least for what he seeks. To demonstrate, we hear so much to-day about farming not paying, from men who are already engaged in it. I have taken occasion in many instances to examine into many individual cases of this kind and find the conditions for success are impossibilities to begin with. Here is an example, a man whom I know has a 100 acre New England farm, two-thirds of it is forest or natural pasturage, so called; the remainder has been under cultivation at some time or other, but nine acres are all that he tills each year. Now the forest land furnishes him his fuel and not much more under his method of management; the meadow his hay, which about compensates for the labor in harvesting it, while the nine acres under cultivation must produce his salary. He raises an acre or two of potatoes and the remainder, with the exception of a small farm garden, is devoted to ensilage corn. He makes milk for retail trade carrying about ten cows, has a span of horses, and thinks he needs a cheap hired hand. This man is staring providence in the face and attempting an impossibility when he courts success under his conditions. His taxes, horse and cattle foods, hired labor, depreciation in buildings and tools, etc., amount to more than his income. He aught to know he is attempting an impossibility—and finding fault will never overcome his conditions; think of it, only nine acres, which if it produced maximum crops each year would not give him cash net returns over $30 an acre for the crops he is raising, or $270 possible income for the year.

If a man expects to make a success he must form some idea of his real worth, and what he ought to make as a salary for his own satisfaction; then study out what he must do in the way of farming to accomplish the desired results. If I consider myself only a $300 man and I am growing hay for market, if my land is in good heart and I can produce an annual yield of three tons per acre and this sells at, say $15 a ton, it will take only ten acres to satisfy my demands, allowing one ton per acre for expense in harvesting. If I will not be contented with less than $1,000 or $2,500 a year, I must greatly adjust my base of operation.

Here again is where horticulture comes to the New England farmer's assistance, if he courts it. If the nine-acre man had devoted his attention to some horticultural crops, such as an acre or so of currants or combination of any of the following crops as—raspberries, onions, squashes, cabbage, tomatoes, celery, cucumbers, gooseberries, strawberries, peas, sweet corn, etc.; or orchard fruits if well taken care of, his chances for success would be possible.

I know of one man in New Hampshire who netted $200 on currants from one acre four years after the plants were set. An acre of currant bushes set 4 x 5 feet takes 2178 plants.

Mr. Crawford of Ohio, has raised 7,000 quarts of strawberries on a single acre. You and I ought to raise one-half that amount, or 3,500 quarts, which at ten cents, equals $350.

Muskmelons in hills 5 x 6 feet make 1,452 hills to the acre, and the small netted gem kinds will average ten or more to the hill under good culture, or 14,520 melons, which at four cents a piece would bring $580.

Tomatoes are as commonly used as almost any crop grown. Although the tomato is one of the rankest of plants and an assured producer, it is ever in demand in New England. Even with an increased demand for the canned product, which largely is shipped into New England, our local markets continue firm. Not only do we find a market for all ripe fruit, but I find gardeners who are growing the late Buckeye state variety simply for green tomatoes. The green fruit when well graded brings fifty cents a bushel at retail, or forty cents at wholesale. Five hundred bushels per acre of green fruit is a fair estimate which at forty cents equals $200, which can be relied upon. For ripe fruit the price will average seventy-five cents or more for the season. Our Earlianas, one of the newly introduced early varieties, sold during the fore part of the past season at $3.00 a bushel.

Small fruits of all kinds sell well here in New England. I have already referred to the red currant, but raspberries, both the red and black caps, are in good demand, and from my experience usually sell for a third to a half higher price per quart than in the west. Blackberries and gooseberries are often not to be had in some of our fairly good sized towns.

The plum crop should receive more attention generally on our farms. While the black knot, plum curculio, and fruit rot, are

somewhat troublesome, they nevertheless should not discourage anyone if the trees are given the necessary care. At the New Hampshire Experiment Station we have fruited Burbanks at the rate of two and one-half bushels on five-year-old trees, and I was interested to note an article from Mr. A. A. Halliday of Windham county, Vermont, in a recent publication, stating that he had secured as high as seven bushels from six-year-old Burbank trees. When we realize that one tree requires an area of only 16 by 16 feet, or at the rate of 170 trees to the acre, surely the returns must be good. Other varieties of plums as Abundance, Lombard, Chabot, etc., are equally good.

We have one man at Wilton, our state, who raises on an average eight tons of grapes a year, and has had success in growing this fruit for the past twenty years. Many think the grape not adapted for many sections of New England, and still others think even if they could grow them, they would be unable to sell them on account of the competition with the quantities of this fruit that comes into New England from other states. I believe both of these notions are erroneous. Adaptable varieties can be grown in most sections if properly handled, and there is always a loyalty to home grown fruits. Mr. Bachelder, the man referred to, tells me that all of his eight tons are sold within a radius of five miles of his place. The Moores Early, Worden, Wyoming and Green Mountain, have all done well at the New Hampshire Experiment Station.

There is little reason why a man with any interest in his calling should not be able to inform himself in regard to the principles of the modern culture of any of our horticultural crops. The days of apprenticeship methods of finding out how to do things is relegated to the past; to-day we have plenty of literature and the main test is putting it into practical application. Culture, however, means much more than we are liable to credit it with. The culture of any plant means ideal conditions for its development for whatever purpose desired.

Too much attention can not be given in studying varieties. These are changing constantly, and it is highly necessary that we take advantage of those that are best adapted to our conditions and the markets.

Executive ability is needed upon the average New England farm, for success, as much as it is anywhere. The average

New England farmer needs to study business methods, and horticulture with its greater intensiveness and variety, will assist very much in testing the business ability of men everywhere should they engage in it. Perishable fruits or vegetables demand active business methods in handling at the right time, while the other farm crops like hay, milk, beef and wood are handled "any old time" as they are staple commodities. Business methods stand for a large share of success in anything, and it must not be lost sight of on the New England farm.

Horticulture on the farm has its place, and should not be neglected. It pays for family use if in no other way. Horticulture on the farm pays for the education of the young. Horticulture on the farm pays, for it keeps the boy there. Horticulture on the farm pays, for it makes the pocket money. Horticulture is education in plant life. For example, grafting, pruning, budding, propagation, rotations, varieties, soils, fertilizers, cultivation, etc.; these and many more can be studied. It is with these and many other advantages that a much broader horizon is attained. Study possibilities and aim high. Horticulture demands time. Peter Henderson recommends that seven men and three horses should be had to run a market gardening industry of ten acres successfully; and that when embarking in such an enterprise a capital of at least $300 per acre is necessary. One thing that ever needs emphasizing is, do not attempt too much.

It has not been thought advisable nor is it possible to go into other than a general discussion of the subject of "Definiteness in Horticulture" in the short time allotted me. Such subjects as details in small fruit growing and various other vegetable and fruit crops, not to say anything about general floriculture and innumerable other questions of horticultural interests can not be touched upon; they in themselves would each require much time and afford material worthy of much consideration.

In closing, I simply desire to say that under modern husbandry and methods, I believe that we at present little realize the possibilities of horticulture in its various branches until a definiteness of purpose is put into it.

APPLES AND ROSES.

By Julia Harris May.

What shall I write,
O wise Pomologists, for you tonight?
You who have watched the reddening apples fall,
I that have done no harvesting at all.
You that have nurtured apples, pears and plums,
I that have spent my life in "doing sums
Or writing verses,
What new thing can I
Write for your pleasure?
I can only try
From old, old books, or folios, to cull
Something of fruit, or flowers beautiful.
In musty drawers, or mouldy desks, maybe,
An ancient myth shall make a rhyme for me.
Then listen! Look! Upon your arms I throw
A poem, gathered from the long ago.
Yes, long ago,
Longer than oldest calendars can show,
There lived a maiden, radiant and fair,
Her name Pomona; golden was her hair;
Pink was her cheek and stately was her mein;
Warm was her heart, and luscious was her lip.
Vertumnus longed its honey-dew to sip.
But, as he neared her, clad in robes of green
She fled before him.
Sometimes, to his sight,
She showed herself, a nymph of shining light,
And then she vanished,—
Other lovers sought
To woo the maiden, but she loved them not.
"If I might win her," wise Vertumnus cried,
"Though by deceit, I should be satisfied."
And so, one day, he took the ugly form
Of an old woman.—Through a blinding storm,
He sought Pomona; told a woeful tale
Of women, sad, and poor, and wan, and pale;
Of maidens, lovelorn, and unfortunate;
He touched her heart. (She was compassionate.)
And then, transformed into a blooming youth,
Told his own tale, of Love, and Hope, and Truth,
Till she loved also; and, she went with him
To Hymen's grove, and, 'neath the shadows dim,

They swore eternal faith, and daily he
Plucked golden apples from Pomona's tree;
Yet often wondered, joy that was so sweet,
Came to his life, through byways of deceit.

Another story of an apple, I
Bring from the legends of the long gone by;
You know it well.—Upon the wedding night
Of Peleus, and of Thetis, from Heaven's height,
Eris, the god of Discord, boldly threw
A golden apple to the gods.—They knew
No hidden meaning, till wise Peleus read
Upon the apple, and interpreted,
"Detur pulchriori"
"To the most fair"—
"Whose shall it be?"
Minerva claimed it there.
Juno and Venus both demand the prize,
Though none deserves it in the other's eyes.
Which goddess should the golden apple own
Was left to Priam's son.—Delights unknown
Each promised Paris. Juno promised wealth;
Minerva, glory; Venus, Love and health;
And Grecia's fairest maiden for a wife.
So Venus conquered, and the dreadful strife
Among the angry goddesses began,
'Till Helen, who had beauty greater than
All other mortals, (Menelaus' dame)
The wife of Paris treacherously became—
Achilles rages.—War and strife increase
Between the land of Troy, and land of Greece;
And, from an apple and a woman rose
A war, whose story through the ages flows.

We read these legends, and the rapt soul hears,
Mingled with fables, songs of other years.
O golden apples of our early youth,
Ye hung above us, night and day, forsooth.
We reached you; touched you; but we did not take;
Ye vanished, for the dragon was awake.
Or, while we looked and longed, some Hercules
Had seized our apples of Hesperides.—
O crimson glories of our later prime,
The Summer Sweetings of our August time!
We seek ye, longing, but some other holds
The apple of our joy, beneath his folds.
We seek ye more and more, from day to day.

And long to climb the tree another way.
Dear red-cheeked apples from home trees that fall,
Ye are far better to my heart, than all
The golden myths of the Hesperides.
I love the orchards with their loaded trees,
I love the glory of the Autumn woods;
I love November, with its solitudes;
I love the fireside light, in cold December,
When, looking gayly at the blazing ember,
We listen, listen, to the sleigh bells' sound,
And tell old tales, and pass the apples round.

Not of the fruit alone our lips shall sing;
With springtime songs our hearts are echoing.
We sing remembered blooms of early May.
We dream of blossoms, strewn along our way
In days of yore. Their fragrant breath we take
And sing of roses for the mother's sake.
Yes, though the flowers wither, still we know,
Within the fruit, the future petals grow;
And we are sure, where'er we go,
Even while the tear drops start,
The vanished rose we used to know,
Is blooming in the heart.

Hark. Summer's step is southward bent.
Her footfall, faint we hear.—
The air holds not the lilac's scent—
No robin thrills the ear—
The leaves are dying, as we go.
But we sing, as they depart,
"Though the buds be covered with frost and snow,
There are roses in the heart."
The rain is chilling the brown old Earth,
Stripped of her Summer dress.
There is warmth and love by the fireside hearth,
But without, is cheerlessness;
For the trees are bare, and the cold winds blow,
Yet I sing, without fear or art,
"Though the gardens are covered with frost and snow,
Roses may bloom in the heart."

The red-lipped apples fill the bins;
The purple grapes are gone;
The pears are picked; the sky begins
To make its yearly moan;
But, in the cellar, apples wait
My longing lips to suit,
And, if the springtime should be late,
The heart has golden fruit.

The mountains were blue in the August days,
But now, they are tipped with white;
And a cloud, just above the summit, stays;
The snow will be falling to-night—
But we sit by the fire-light's ruddy glow,
And sing, "Let the Summer depart—
Though the Earth be covered with drifts of snow,
Roses may bloom in the heart."

Thicker and faster the snowflakes fall;
Higher the pale drifts rise;
The bushes are covered, and white drifts all
Lift their white arms to the skies;
December is coming, but, far below,
Sweet buds are ready to start;
And the Summer her backward way shall know
By the roses in the heart.

Then, while the snowflakes for the rose leaves fall,
And old Novembers through the windows call,
With memories in my heart, a fragrant throng,
I raise my voice to sing a harvest song.
Not of the Gardens of Hesperides,
The golden apples upon golden trees,
Not of the apple, royal Paris gave
To Venus for her beauty, would I have
My Harvest Hymn.—
Not those that Mother Eve
Gave to her husband, without Heaven's leave.—
"She took it first" (old Adam's lame excuse,)
I would not offer for your modern use.
"The Devil gave me, and so I did eat"
(Eve's foolish reason,) why should I repeat?
Not such theology to you I bring,
Nor, from old legends, lift my songward wing,
Not these I sing.
I sing of orchards on the hills of Maine,
Bearing, each year, their golden balls again;
Of crimson fruit, that August breezes fan,
The blushing Baldwin, and the Astrachan.
The purple grapes, that twine on sunny slopes;
The golden pumpkins; and the canteloupes—

I sing the Summer Sweeting, none so good—
Delicious memories of my maidenhood—
I shake the tree, and, on my head, comes down,
A shower of apples.—From the grasses brown,

I fill my basket, and my treasures bear,
Where happy mates, its autumn sweetness share—
I sing and sing, and, as I sing, I eat
Another apple, toothsome, soft and sweet—
Upon the laden boughs we gaily swing,
The topmost apples, from its branch to bring.—

I sing the story of the paring bee,
The paring and the quartering I see;
The coring, and the stringing; and I seem
To gaze far back, into a childhood dream—
I sing the perfect string, hung firm and high;
(I cannot sing of the dried apple pie.)
I sing the pretty girls, "the Mission's" peril—
The "Copenhagen," and the "Hunt the Squirrel."

I hear Amanda, as she counts the seeds,
Blushing and laughing, for, she plainly reads
Her fate in numbers—
"One's my heart's desire—
Four I take, and never forsake,
And five, I throw in the fire—
Six—he loves"—
What shouts arise!
Oh see those tossing curls!
"Nine, they both love."
Ah, those eyes—
Those happy boys and girls!

I sing Snow apples, full of crimson juice,
Barreled away for late December use.
I sing the Greening, large, and full, and round,
From month to month, better and better found.
I think of apple sauce, and apple pies,
And dumplings, and turnovers greet my eyes,—
And rich mince pies, and every fruitful thing,
Of these I sing.—

I see another apple, hanging high,
And sing the glory of the Northern Spy.
I listen to the buzzing of the bees—
And pick the white-winged blossoms from the trees,
And wait and wait, until the apples fall,
And sing my song,
"These are the best of all"—

Then sing the Harvest song, the song of fruit—
The merry jesting, and the glad dispute—
The anthem of Thanksgiving, let us sing,

While all we love are homeward gathering—
Yes, sing my song, and lift with me a prayer:
"God keep us all—We thank Thee for Thy care,
We thank Thee for the fruitage and the flower,
The Roses and the Apples—Give us power
To do the right, avoid the wrong, and bring
Our praise to Thee upon November's wing."

Thus did I write,
Oh wise Fruit-growers—but I long to-night
To throw the prosy verses all away,
And sing the poem I have seen to-day.
If I had seen
Those glorious apples, golden, crimson, green,
If I had seen those grand Chrysanthemums,
(Oh how their beauty to my vision comes)
The double-white, the feathery pink, the red,
The grand prize blossom; and, interpreted,
I might have written poetry, instead
Of empty rhymes.—
And, when the song was done,
Have had a shorter and a better one.
They are the poem, shown to me,
But why should I rehearse
Their loveliness?—
In them, you see
God's own resplendent verse.

SECRETARY'S PORTFOLIO.

GEORGE B. SAWYER.

After a residence of more than forty years in Wiscasset, George B. Sawyer, Esq., died at his home September 19, 1903. "Wiscasset," says the Sheepscot Echo, "loses a citizen who has been prominent in its business and official life and who was well known throughout the State."

George B. Sawyer was born in Henniker, N. H., February 28, 1834, son of Jacob and Laura (Bartlett) Sawyer. His ancestry on the maternal side is said to be traced from Sir Adam Barttelot, who entered England with William the Conqueror.

George B. Sawyer acquired his early education in the public schools of Manchester, N. H. His preliminary training for active life included employment in printing offices, and in after life he often referred to that experience as having been of great benefit to him in an educational way. At the age of twenty-one he began the study of law with the Hon. John N. Goodwin, of South Berwick, Maine, and was admitted to the bar in York county in his twenty-fifth year. In the same year he was admitted to practice in the United States District Court, at Portsmouth, and at a later date in the United States Court of Claims at Washington, D. C.

Mr. Sawyer first located himself for practice in his profession at Salmon Falls, N. H., and in the fall of 1859 he removed to Waldoboro, in this county, where he practiced in partnership with the late Gov. S. S. Marble until April, 1862, when he was appointed to the office of clerk of courts for Lincoln county, and came to reside in Wiscasset. He continued in that office until January, 1878. On retiring from office Mr. Sawyer resumed the practice of law, in which he continued until his decease.

He held other public offices: During the administrations of Presidents Garfield, Arthur and Harrison he was the collector

of customs for the district of Wiscasset serving in that office in all over eight years; he served for several years as one of the selectmen of Wiscasset, at a time when his business training and abilities were of great service to the town. In 1881 Mr. Sawyer was a member of the Maine State Valuation Commission, and acted as clerk of that body. He was long a prominent official of the Lincoln County Bar Association, and was a member of the Maine State Bar Association. He was one of the founders of the Wiscasset Savings Bank in 1866, and served as a trustee of that institution for more than thirty years and as its president from 1885 to 1898.

Mr. Sawyer, more than all these matters, was a man who enjoyed serving public interests. After the Civil War was over and the farmers were awakening to the possibilities of agriculture in the State, Mr. Sawyer was ready to lend a hand to the forward movement. He realized the importance of fruit growing, knew by his own observation that the climate was favorable. Thus it was in 1873 when the Maine State Pomological Society was organized he was found among the original members of that society, and with our president as its first presiding officer he became its first secretary and treasurer. In his report for the first year, referring to the Hon. S. L. Goodale: "It is to be regretted that at the organization of this society he was unwilling to accept the office of secretary for which he was so well fitted. That which to him would have been an easy labor, and to the public a valuable service, is to a novice a laborious duty."

Mr. Sawyer thus gave some idea of his own estimate of the work he had taken upon himself. Many times I have glanced over the pages of this report and those edited by Mr. Sawyer during his secretaryship, and I am well nigh appalled at the work he put into them, for every one bears the mark of his diligence and research, for at that time less was known of fruit culture and the data were available only to those who searched it out. His observation, confirmed by the experiments he conducted on his own grounds, convinced him of the possibilities of fruit culture in Maine. He sought knowledge of fruits from the books he bought, from the people he met and from the fruits he grew. Freely he imparted the knowledge thus gained. To my mind he was an ideal secretary, and the vast work he per-

formed for the public here stands as a lasting monument to his memory. Let us rejoice at the good fortune of the society in securing such faithful service in its early life.

Mr. Sawyer continued as secretary and treasurer until 1885 when he resigned and was succeeded by the Hon. S. L Boardman. A long term of office during which he had the full confidence of all his associates. I sometimes fear in the rush of this busy world we too often forget the work of those who have gone before, and for one I take pleasure in making this public recognition of Mr. Sawyer's invaluable service to the society and the people of the State.

He was active in all local matters that concerned the welfare of the town in which he lived. For many years he was a director of the Wiscasset and Quebec Railroad. From its formation he was a member of the Republican party and took an active interest in all its councils. He was a prominent Mason and a loyal citizen.

Mr. Sawyer was married in 1859 to Miss Annie A. Lord of South Berwick, by whom, and by their daughters, Annie L. Sawyer, Edith A. Sawyer and Helen F. Sawyer, he is survived.

EDWARD K. WHITNEY.

Edward K. Whitney was born in Harrison, Me., September 9, 1824. He started in life as a brickmaker, but moved to the farm to live with his wife's father, Marquis D. Caswell, in November, 1853; this was the farm now known as "Hillside Farm."

As early as 1855 his interest in orcharding began when he commenced to graft the orchard set out by Mr. Caswell in 1819. He continued to graft trees every year until he left the place in 1894, or a period of forty-one years; he also, for quite a part of the time, maintained his own nursery.

The number of trees is unknown, but this year, the present proprietor, Mr. Wm. Breed, sells over 1,000 barrels of winter apples alone. He also had a large pear orchard, second only in number and output to his apples and was said to be the first man in Maine to sell native peaches in the Lewiston market and raised figs sufficiently to prove that they could be ripened in this climate.

He was in failing health the last three years on the farm and his death occurred February 14, 1897.

Mr. Whitney became a life member of the Pomological Society in 1882. Although he was not able to meet with us much he always seemed to have us in mind whenever he had any particularly nice specimens of fruit. At our Farmington meeting he sent over some beautiful specimens of Baldwins that attracted much attention. In the locality where he lived he did much by word and precept to improve the quality of fruit and to increase its production.

HENRY L. LELAND.

Henry L. Leland was born in Sangerville May 14, 1836. His home was always in his native town. He died June 26, 1903.

Mr. Leland was well known as a writer and lecturer upon agricultural subjects. Hs was for several years a prominent member of the Maine Board of Agriculture and his services as an institute worker were of a high order. He was a regular correspondent to the Maine Farmer and several other papers. His articles were always timely and helpful. As a citizen he was interested in all town affairs especially all that pertained to education. As a member of the grange, and in his daily life, he strove to interest the young in the work of the farm and to realize the necessity of living temperate, earnest lives. Those who knew him best knew the love he had for all beauties of nature and this love found outward expression in beautifying the home grounds with shade trees also the roadsides not of his own farm only but of adjoining ones as well.

Each tree in the orchard of nearly seven acres which he set was raised from the seed and grafted by his own hand—a fact in which he took great pride. He was deeply interested in the Maine Pomological Society being familiar with and active in its work from its first inception. The annual meeting at Dexter was one of especial interest and he often said the whole tenor of that meeting seemed to be "Raise only those varieties that are in themselves good and so maintain and add to the reputation of Maine fruit,"—a point he always urged.

"Along thy steps fair orchard hill,
Climbing high and higher still,
The fruit trees reach in lines of green,
Like burnished warp of emerald sheen,
Through which Pomona's lavish grace
Woof of richest fruits have traced."

In addition to the above which is kindly contributed by Mr. Leland's son, Will E. Leland, the secretary will say that he was much respected by the members of the society, and at the time of his death was one of the vice-presidents of the society. His work for the industry in Piscataquis county especially was very great.

LEMUEL GURNEY.

Lemuel Gurney, one of the best known citizens of Hebron, died at his home in that town Sunday, February 8, 1903, at nearly seventy-seven years of age, after an illness of several weeks from a heart trouble. Mr. Gurney was born in West Minot. In his early years he worked for a while at shoe manufacturing in Natick, Mass., but more than fifty years ago he returned to Maine and settled on the farm in Hebron where he has since lived. He has added considerably to the original acreage of his farm, and by making a specialty of fruit raising has given his farm quite a reputation as a fruit farm. His maple syrup and sugar were of a quality which gave them a fame beyond the limits of the State, and his only difficulty in disposing of these products was to know which orders to fill. He was a regular exhibitor at county and State fairs, and no long-familiar figure will be more missed at those fairs than that of Mr. Gurney.

Mr. Gurney was twice married. His first wife, Calista C. Barrows, died in 1881. In 1892 he married for his second wife Mrs. Lavina J. Haskell, who survives him. He leaves an adopted son, but has never had any children of his own. He was a regular attendant at the Baptist church, though not a member. He was an active worker in the grange.

Mr. Gurney's most prominent characteristics were his honesty and uprightness of character and his unfailing pleasantness of disposition and kindness of heart, known to all who had any

acquaintance with him. No great deeds has he ever done, but the memory of this honest, unpretentious, kindly citizen makes a fame perhaps as well worth having as that belonging to many whose names are high on the scroll.

The above sketch appeared in the Hebron Academy Semister shortly after the death of Mr. Gurney. The secretary wishes to add that he was a life member of our society and an exhibitor of fruit for many years. He was a frequent attendant at our annual meetings and heartily enjoyed them. He was a very genial, companionable man to meet, and his pleasant smile and agreeable words will be long remembered.

THE CIVIC IMPROVEMENT LEAGUE.

This branch of organized work carried on by the ladies of the State has been set forth in the address of Mrs. Emma Dow Armstrong of Lewiston, which may be found in the body of the Transactions. Mrs. Cora E. Nye, president of the Lewiston League has kindly furnished The Portfolio with the following regarding the work being done in Lewiston. It is full of suggestions to others and there is need of this kind of work all over Maine.

The Civic Improvement League of Lewiston has been instrumental in procuring about a dozen cans for rubbish and much of the waste paper which formerly blew about the streets is now deposited in them. Between two and three dozen settees have been placed upon the park and several at street corners, where they accommodate a large number of people while waiting for the cars. A beautiful bed of hydyrangeas has been planted on Nichols park, a bed of geraniums has been set at the foot of the soldiers' monument on City park. A fine piece of sidewalk has been built, or laid, on a prominent street which was much needed, the streets have been kept much cleaner than formerly and a great deal of pains has been taken to kill out the weeds, burdocks especially, which grow along the sides of the streets. The Davis Corner school building has been renovated at the earnest and active instigation of members of the league. Protestations against the filthy habit of expectorating on the sidewalks and in public buildings have been made emphatic, and

a warfare is being waged against uncovered loads of dressing being hauled through the streets. The league has a committee who are working to secure playgrounds for children and young people and in the future we hope for a public gymnasium and free baths. Next season a larger appropriation for parks will be asked for from the city fathers as we desire to see plants and shrubs growing in abundance where now there is a lack. The river banks are a source of annoyance to every one who longs for a city beautiful and in time we hope for great improvement in that quarter as we hope for improvements all along the way too numerous to mention.

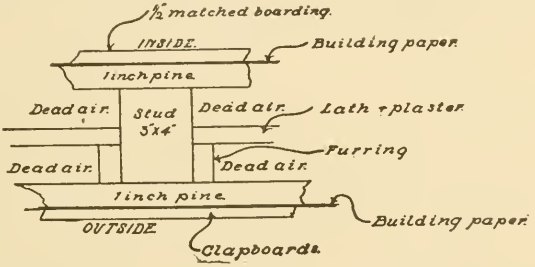
I wish to thank you heartily for the evening devoted to civic improvement at your Auburn meeting. Your display of fruits and flowers was wonderfully fine, you must have reason to be glad at the success of your meeting, and I wish that each meeting in the future may give you greater satisfaction than any in the past.

STORAGE HOUSE SPECIFICATIONS.

(See Illustration of House on Page 40.)

Through the courtesy of the Orange Judd Company of New York, we are able to publish this and the following illustration from Professor Waugh's "Fruit Harvesting, Storing, Marketing." The illustration shows the apple storage house of Mr. T. L. Kenney of South Hero, Vt., and the description is from Prof. Waugh's book above mentioned. It was built in 1888. It is 30x40 feet. The main story is 8 feet 4 inches high in the clear; the basement is 7 feet 4 inches high, and the loft, or second story, is 7 feet high. The large room on the main floor is used primarily as a sorting and packing room, but can also be used for storage when the basement is filled. It will hold 1,000 barrels, piling the barrels three tiers high, which is as convenient as any way. The basement is the main storage room. The apples are let down to this from the main floor by an elevator. This basement also has an outside door at the end opposite the one shown in the prospective. Barrels may thus be unloaded or loaded without being carried through the main floor. This

basement room has no floor except for some loose boards laid down to keep the barrels off the earth. It has several small ventilating windows near the top, and the door is closed with a heavy, double-planked door, which is kept shut after cold weather sets in. This room also has a capacity of 1,000 barrels. The upper story is used as a storage for empty barrels, coopers' stock, etc. The main door opens upon the first floor. The sill is about 3 feet 6 inches from the ground; but the door is approached by a driveway, shown in the illustration. The windows are of glass and covered outside with heavy board shutters. The drawing shows the manner of finish. The outside finish consists of three



layers, as follows: (1) a layer of 1-inch matched pine, (2) a layer of building paper, (3) a layer of clapboards, well painted. The inside finish is also of three layers: (1) a layer of 1-inch matched pine, (2) a layer of building paper, (3) a layer of half-inch matched boarding, heavily painted. The painting is important. Between the outside cover and the inside finish, and between the studding, there is another layer consisting of lath and plaster. The position of these various layers will be understood by reference to the drawing. This leaves two dead-air spaces in the walls, one on each side of the layer of lath and plaster. This house cost $1,500.

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